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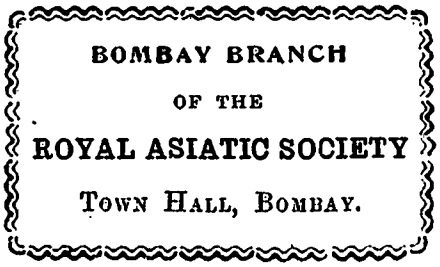

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THE NATURAL HISTORY,

ANCIENT AND MODERN,

OF

PRECIOUS STONES AND GEMS,

AND OF

THE PRECIOUS METALS.

1795

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"IOVI CVSTODI ET GENIO THESAVRORVM."

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PREFACE.

PRECIOUS STONES are things in which most people take an interest, either practical or speculative; the owner of a jewel, however insignificant, is naturally desirous to know something about its character and value. To such inquirers purely scientific treatises are distasteful, and indeed of little service. The two or three books upon Precious Stones, written for the use of the trade (like Jeffreys' and Mawe's), are from their technical nature dry and uninteresting; and, besides, they have now become extremely scarce.

This want the present work is intended to supply. It has been undertaken upon a somewhat comprehensive plan, which may thus be briefly exhibited. It is a novel one, or, more truly speaking, so obsolete as to have all the recommendation of novelty, for in the mode of treating the subject I follow in the steps of Pliny, and of the early restorers of Mineralogy to the rank of a science. Like them, I commence with the natural history of each species, its chemical composition (in their age merely guessed at), its origin, place producing it, its varieties, distinctive characters, the counterfeits of it, and its ancient and present value. In doing this my object has been to make the part relating to the Mineralogy of the ancients, so far as our subjects coincide, as complete as possible; an undertaking to which Corsi has led the way in his admirable 'Delle Pietre Antiche;' although, from the more general character of his treatise, only very restricted limits could be there allotted to the section upon Precious Stones.

This department had been already sketched out, though very imperfectly, in the First Section of my 'Antique Gems.'

The outline has now been carefully corrected and extensively amplified, and filled up by my subsequent researches, and by observations made in some important collections which have since passed under my examination. The translations illustrating the former sketch have necessarily, on account of their importance and interest, been employed, after revision, in the remodelling of the articles to which they applied.

In thus considering my subject from the antique point of view, a remarkable feature presents itself in a conspicuous light, though one which doubtless will be altogether new to the generality of my readers. This is the consideration of gems as magical and medicinal agents, perhaps the most important of their characteristics in later antiquity, as it certainly was throughout the whole course of the Middle Ages, when the beauty or rarity of a stone went for infinitely less in the estimation of its value (the Toadstone, for example) than its reputed virtue in the Pharmacopœia. This curious division of my subject, which indeed contains the entire mediæval natural history of the same, has been utterly neglected hitherto. Yet it has always seemed to me full of interest; and it is hoped that the facts collected in its illustration, and the strange superstitions connected therewith, will render it equally interesting to others, especially to such as take a pleasure in resuscitating old-world modes of thought. With this view the translation of Orpheus 'On Stones' has been appended; that poem, besides its own merits, being the sole (and perhaps the most ancient) representative left of the mystic lore of Chaldæa; that "magorum infanda vanitas," which, ridiculed by the philosophers of the age, but fondly and fully believed in by their contemporaries of every rank, and augmented as time went on with yet more monstrous fables, remained the established faith down to the days of our own great-grandfathers.

My second object being to exhibit the relation borne by these matters to ornamental art, I have everywhere inserted

the most authentic descriptions attainable of note-worthy jewels, and of celebrated gems; especially of those possessing an historical interest: and from their very nature, as once appertaining to the mightiest in bygone times, no class of relics is richer in similar memories. A large series of collectanea, illustrating this branch of antiquity, will be found arranged together in the Appendix, under the respective heads to which these monuments belong. With these details another consideration is connected. The uncertainty as to the weights of celebrated Diamonds, owing to the varying statements of the same given by different writers, is a constant subject of complaint. Much care has therefore been taken to ensure accuracy in my notices of this particular. Again, there is no class of relics (except sacred) whose whole history swarms so largely with confused and conflicting stories, re-copied and re-blundered by careless writers, of which the "Sancy" and the "Mogul" perpetually furnish the most glaring examples, whenever some fresh event (like the recent sale of the former) occasions their being quoted, and these fictions to obtrude themselves in newspaper paragraphs. The facts here adduced from contemporary and trustworthy authorities will suffice, it appears to me, to settle these points to the satisfaction of all who wish to know the true origin and fortunes of these long-famed jewels. The outlines given of the dimensions and patterns of the largest known Diamonds, besides serving to establish most important data in their history, will be found accurately to represent their appearance; and at the same time are instructive, as exemplifying the fashions after which all other gems are cut.

The modern division of this treatise is reviewed in its due place in the respective articles; and is furthermore elucidated by the Table of the Chemical Analysis of the different species, and by the accurate diagrams of their crystallization accompanying it. This arrangement seems to me to convey quite as much information upon the scientific part of their natural

history as will be required by the general reader, who wants nothing more than the knowledge necessary to enable him to recognise a precious stone when presented to him by chance in its native condition.

Now that British gold-mining is exciting so much interest, from the unexpected success which has attended its prosecution in North Wales, the details here collected respecting the operations and processes of the ancients in the same art will doubtless prove acceptable to many; especially as we are now re-opening the *placers* anciently worked by the Roman masters of those regions according to the very methods so fully specified by my authorities.

My subject having thus been approached from so many different sides, and so much more comprehensively than has yet been attempted in our language, there seems a fair prospect of my labours proving acceptable not only to the classical student and the archæologist, but also to the unlearned admirer of these flowers of the mineral kingdom, as well as to the intelligent jeweller who may be disposed to see in gems something more than mere baubles got up to sell. A treatise of this kind seldom obtains a continuous perusal; when, therefore, the same quotation or remark appeared equally illustrative of two different articles, it has been introduced a second time without scruple. In writing with no other purpose than to give information concerning matters somewhat obscure, tautology is less to be avoided than indistinctness of meaning; besides, such repetitions serve to render each article complete in itself. And for the same reason a book mainly designed for a book of reference, being only available to the consulter through the medium of the index, special attention has been bestowed upon that part to render it serviceable by its fulness and accuracy.

The decorative tailpieces serve also to exemplify the value of the glyptic art (the sole art that literally works for immortality, and of whose particular materials the pages treat), in

the light it throws upon every branch of archæology: an assertion which will be found amply established by the accompanying explanation of their designs. They possess the additional recommendation of being derived from unpublished originals, having been all taken from gems of my own, selected on account of the interest of their subjects, and their indisputable authenticity. They have been drawn and engraved for this work by Mr. R. B. Utting; and a very extensive acquaintance with the numerous splendid volumes on Dactyliography, which commanded the best artistic skill of the last century, enables me confidently to declare that these woodcuts surpass in fidelity, whilst they equal in execution, any reproductions of antique gems hitherto achieved. To the kindness of Professor Tennant I am indebted for the loan of the cuts of the Star of the South, the Koh-i-noor, Mr. Dresden's Diamond, and the Imperial State Crown of England.

C. W. KING.

Trinity College, May, 1865.

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NATURAL HISTORY

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PRECIOUS STONES, METALS, AND GEMS.

INTRODUCTION.

MINERALOGY OF THE ANCIENTS.

PLINY has quoted by name numerous mineralogists, for the most part Greeks, from whom in great measure he drew the materials for books xxxvi. and xxxvii. of his Natural History. The principal of these, to judge from the character of his quotations, and his incidental notices of the authors, were the following:— *Sotacus*, cited as "one of the most ancient writers on the subject" (xxxvi. 38), apparently a physician, like Ctesias, at the Persian court: for he stated in his work ("scripsit") that he had seen the wondrous gem, the Dracontias "apud Regem" in the possession of *the King;* who, being designated by this sole title, could in accordance to Grecian usage have been no other than the king of Persia. He therefore must have flourished before the Macedonian conquest. *Theophrastus*, Aristotle's successor, much of whose little treatise Pliny has incorporated into book xxxvi. *Sudines* and *Zenothemis*, his main authorities as regards the true precious stones: the latter writer had evidently visited India, as appears from his account of the Sardonyx, its native localities, and how employed by the natives. *Nicander*, probably the physician, author of the Theriaca, into whose poetical pharmacopœia precious stones entered largely by reason of their supposed native virtues. *Democritus*, the philosopher of Abdera,

who had devoted himself, besides speculative philosophy, to the study of Natural History in general. *Zoroastres*, a Magian evidently from his name, quoted for his definition of the Daphnæa and the Exebenus: and also by Marbodus on the virtues of Coral.[1] That however he did not confine himself to the declaration of the mystical properties of stones, appears from what he says of the Exebenus, that it was used in the arts for burnishing gold, was opaquely white and pretty-looking.[2] *Callistratus*, a writer on precious stones exclusively. *Metrodorus* of Scepsis, probably the councillor of king Mithridates, that great amateur in gems. *Zachalias* the Babylonian, who had dedicated to the same monarch a treatise on the mystic virtues of stones.[3] *Archelaus*, "who reigned in Cappadocia," and is probably Herod's father-in-law. *Iacchus* and *Bocchus*, the latter, judging from his name, a Carthaginian. King *Juba II.*, the Numidian, the contemporary of Augustus: the loss of whose treatise, considering his position and opportunities[4] for exact information, is perhaps the greatest we have to deplore in this sad catalogue of *desiderata*. Latest of all came *Æsarubas*, apparently of Punic race, and Pliny's contemporary, for he cites him (xxxvii. 11) as "qui de his nuperrime scripsit, vivitque adhuc Æsarubas." His African origin may be inferred not only from his name, but from his being quoted as describing a lake in Mauritania that produced amber.

Of all this extensive literature nothing whatever is extant, except the meagre treatise by Theophrastus, written shortly before B.C. 300; and the elegant, but almost, in a scientific point of view, valueless, poem of the Pseudo-Orpheus, the date of which is altogether conjectural.[5] Theophrastus has treated chiefly of the

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[1] From the similarity of many passages quoted by Pliny with certain verses in the Λιθικὰ ascribed to Orpheus, there is reason to suspect this to be the identical work of Zoroastres.

[2] A species of hæmatite, "pierre de brunissoir," is still used for this purpose for gold inlaid into steel, an art for which the Indians have ever been famous.

[3] "Describing their influence on the fate of men." He may have been a Jew, the name being *Zachariah* Grecised. In Persian there was but one character for the L and the R.

[4] The succeeding articles will show how large a proportion of the stones of colour the Romans obtained from the North African coast.

[5] An attempt to fix its date will be found subjoined to the translation of the poem.

mineral substances used in the arts, their nature, and supposed origin, briefly noticing en passant the very few precious stones then known to the Greeks. This being the sole relic exhibiting the state of mineralogical science amongst his countrymen, a brief analysis of its contents will not be out of place here. (The sections referred to are Schneider's.)

Sect. 1-3. Origin of Stones and Earths: they are made up of a certain pure and homogeneous substance, produced either by a certain flux or infiltration, or else secreted by condensation.
4-5. Their Differences and Qualities.
6. Marbles, Parian, Pentelic, Chernites.
7. Porus, the Black Chian.
8-11. Emerald, Fusible Minerals.
12. Mines at Binae, Combustible Stones.
13. The Spinas, or self-igniting mineral.
14. Liparæa, Pumice.
16. Coal used by blacksmiths.
18. Carbuncle, precious, from Carthage.
19. Carbuncle from Miletus, Adamas.
20-22. Pumice, its different sorts.
23-24. Sard, Jasper, Lapis-lazuli, Emerald.
25. Bactrian, Pseudo-Cyprian, Emerald.
26. Chrysocolla, gold solder.
27. Emerald, its origin, combined with Jasper.
28. Lyncurium.
29. Amber.
30. Hyalites (or Beryl?), Omphax, Crystal, Amethyst, Sard.
31. Lyncurium, Cyanos male and female, Onyx, Amethyst, Agate.
32. Unique gem found at Lampsacus.
33. Carbuncles found in Greece.
34. Countries producing precious stones.
35. Gems used for inlaying in gold (probably the Turquois).
36. Pearls.
37. Fossil Ivory or Occidental Turquois, Lapis-lazuli, Prasites, Hæmatites.
38. Coral, fossil Indian Reed.
39. Gold and Silver Ore, Cyanos.
40. Ochre, Red Ochre, Orpiment, Chrysocolla.
41. Magnetis.
42. Potstone of Siphnos.
43. Gem-engraving.
44. Emery or ἄκονα.
45. Touchstone, assay by fire.
46. Assay of gold by the Touchstone.
47. Touchstones from Tmolus.
48. Earths in general, Artificial Gems (perhaps coloured glass).
49. Glass, Copper Ore, Cilician Pitch, or Bitumen.
50. Earths how distinguished, Sandarach.

Sect. 51. Ruddle, Ochre, Orpiment, how discovered.
52. Ochre Mines in Cappadocia and in Cos.
53. Red Ochre, how manufactured, Cyanos (azure-paint), its three kinds, Egyptian artificial.
56. White Lead, how made.
57. Verdigris, how prepared.
58. Cinnabar, natural and artificial.
59. How discovered by Callias.
60. Quicksilver, how obtained.
61. Origin of the Earthy Minerals, Artificial Gems from Asia.
62. Earths used by painters; the Melian, Cimolian, Samian, Tymphaic.
63. Samian Mines.
64. Gypsum, Fuller's Earth, Tymphaic Gypsum, used for paints.
65-66. Plaster-work and Stucco.
67. Various uses of Gypsum.
68. Its nature, self-igniting.
69. How prepared in Syria and Phœnicia by baking in an oven.

The treatises however of Sotacus, Sudines, and Zenothemis, and probably several of the others, were, as Pliny's extracts show, confined to the subject of the precious stones. Sotacus must have been earlier than Alexander's age, as he speaks of the king of Persia; the others probably flourished under the Ptolemies, when Alexandria had become the entrepôt of the Oriental trade. They appear to have visited the gem-producing regions as jewellers and merchants, for Pliny's extracts from their works bear the stamp of technical precision.

As for the Λιθικὰ of the Pseudo-Orpheus, I am far from agreeing with Tyrwhit's sentence, who puts it down as low as the times of Valens, the middle of the 4th century. In fact, I see no reason for doubting the assertion of the scholiast that it served Nicander as a model for his Theriaca. But however ancient and curious, its value as a mineralogical treatise is very trifling, as it consists of a description of the medical and supernatural virtues of several stones, put in the mouths, first, of the seer Theodamas, and then, by a sudden transition, of the Trojan Helenus.

Epiphanius, bishop of Salamis in Cyprus, composed (about the year A.D. 400) a small tract 'Upon the Twelve Stones of the Rationale, or High-Priest's Breastplate,' which is praised, with but small reason, by St. Jerome, to whom the author had presented a copy. Epiphanius in this compilation appears to refer occasionally to some valuable sources then accessible; but either

quotes them from memory, or else transcribes without understanding their meaning; the last the most probable explanation. His notices indeed are full of the most absurd blunders, and confusion of one stone with another. His principal object seems to have been to point out the medicinal virtues of each stone. The only interesting points to the mineralogist are his definition of the three species of the *Hyacinthus:* and his allusion to the *Adamas* as a "sky-coloured gem:" a proof that his ancient authority upon that head had understood the *Sapphire*, the blue corundum, by that designation.

The book 'On Rivers,' ascribed to Plutarch, but by some to Parthenius, a grammarian of Nero's times, notices particularly the precious stones found in each river, or the mountains adjacent. Unfortunately these notices also are of no scientific value, having reference only to the magical or medicinal qualities of the several gems indicated. To give a specimen of this curious catalogue: "In the Pactolus is found, though rarely, a stone like the pumice, which changes its colour four times a day; it is only to be discovered by little girls as yet too young to know anything, but if worn by nubile virgins it protects them against all attacks upon their chastity. The Sagaris produces the *Autoglyphus* (or 'natural intaglio'), representing a figure of Cybele: this gem, if found by one of her emasculated devotees, enables him to endure courageously all supernatural manifestations. Here too is found the *Aster*, that flames in the dark, hence called *Ballen* or *king* by the Phrygians." The only thing that gives an interest to this compilation of absurdities is the circumstance of the maker's quoting his authority for each statement, and thus attesting the large number of those who *had* before him written on the subject of precious stones. Many of these are not to be found in Pliny's list; their names are therefore worth transcribing, as follows:—*Archelaus*, *Agatharchides*,[6] *Thrasyllus* of Mendes, *Heraclitus* of Sicyon, *Aristobulus*, *Dercyllas*, *Nicias* of Mallos, *Dorotheus* the Chaldean,[7] *Theophilus*.

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[6] An author whose loss is greatly to be deplored, to judge from the value of his fragment on the Egyptian gold-mining, which will be found translated under that head.

[7] A fragment of his poem on Astrology is usually annexed to Manetho.

The nature of the quotations seems to indicate that these writers had principally busied themselves with the supposed efficacy of gems in medicine or in magic. It may be conjectured that, although Pliny names none amongst them, save Archelaus, in his list of authorities serving him in the compilation of his book xxxvii., yet, from the nature of their treatises, we may suspect he both knew, and contemptuously classed them amongst the "impudent Magi," specimens of whose "infanda vanitas" or preposterous lies, he often adduces for the sake of exposing them. To this list Suidas adds *Æsopus*, "reader to king Mithridates," who, to judge from the passage cited 'On the Pan-fish,' followed in the same line of things wonderful.

Of *ancient* Greek mineralogy, this is absolutely all that remains: of the Roman, besides Pliny's inestimable, though too compressed, compendium, somewhat more is extant, although of but trifling importance. *Solinus*,[8] who probably belonged to the weakly Revival in Constantine's age, has in his 'Polyhistor' particularly discussed the article of the precious stones produced by the several countries as he describes them. His notices are often extremely useful, inasmuch as he evidently aims at a more precise and technical description of the precious stones than he found in his precursor Pliny; and indeed he often displays the knowledge of a practised jeweller. In fact, it is impossible to obtain a clear notion of what the Romans meant by certain species from Pliny's description (notably the *Hyacinthus* and the *Sardonyx*) without comparing it with the more systematic definition of the same things as laid down by Solinus.

Lastly, many stones and minerals will be found defined in the 'Origines' (a brief encyclopædia) of *Isidorus*, bishop of Seville in the 7th century. This work has a certain value as containing quotations from many authors now lost. Little, however, is to be obtained from his extracts bearing upon our subject, as he evidently has here contented himself with abridging Pliny's definitions; and that, too often, without clearly understanding his meaning. From Solinus too he has transcribed some passages verbatim, for instance the definition of "Hyacinthus."

[8] He is first quoted by Priscian, the grammarian of Cæsarea, in the 5th century.

But the medical virtues of the species he has extracted from a third source, either Epiphanius, or the original made use of to so little purpose by that abbreviator. As he does not name his authorities, it remains a matter for conjecture who this writer could have been. From the nature of the case, it must be inferred that he had written in Latin, and judging from a certain similarity in parallel passages may have been the pretended *Evax*, whose singular composition, belonging partly to ancient, partly to mediæval science, is the next to come under our consideration.

Some four centuries after Isidorus we find *Marbodus* (Marbœuf), bishop of Rennes, publishing, some time between 1067 and 1081, a Lapidarium, styled in the proœmium "an abridgment of the bulky volume" composed by Evax, king of Arabia, and presented to Tiberius Cæsar. Nevertheless, whole passages in the poem are mere definitions taken bodily out of the 'Origines,' and put into rude hexameters. Intermixed come occasional extracts from Orpheus, whom, by the way, under "Coral," he quotes by name as *Metrodorus:* referring at the same time to *Zoroaster*. Now, Lessing is of opinion that a treatise 'On Stones,' ascribed to *Evax*, was actually then extant, and that there is no reason to doubt the assertion of Marbodus that his own poem is no more than the same condensed. But Evax is not mentioned by Pliny: hence it may be concluded that the work passing under his name was compiled and received for genuine late in the Decline, when these primarily Oriental notions as to the potency of gems had become the general belief, and been accepted even by the philosophers of the times.

Contemporary with the bishop of Rennes, flourished *Michael Psellus*, tutor to the emperor Michael Parapinaces, and the most learned Greek of the 11th century. Amongst his numerous treatises, there is a very brief one upon the 'Virtues of Stones,' describing the medicinal uses of the Diamond, Hæmatite, Amethyst, Carbuncle, Æschates, Beryl, Galactites, Amber, Jasper, Idæus Dactylus, Crystal, Lychnites, Magnet, Onyx, Caprirus, Sardonyx, Selenites, Emerald, Hyacinthus, Chrysoletus, Chrysolectrus, Chrysoprasion, Chalazias, Topazion.

His notices are not worth much, as far as regards the natural

history of the articles, of which he evidently knew nothing. One thing however is apparent, that he drew his materials from another source than did his Latin, or rather Gallic, contemporary.

The causes of these virtues, he says, had been investigated in ancient times by *Anaxagoras*, *Empedocles*, and *Democritus*; and more recently by *Alexander* of Aphrodisia (in the third century), "a person very ready to explain all mysteries of whatever nature."

About a century later appears *Mohammed Ben Mansur*, who may justly claim the honour of being the first to compose a really scientific and systematic treatise on the subject, in his 'Book on Precious Stones,' dedicated to the Abbaside Sultan of Persia, Abu Naser Beharderchan. In this work he treats of each stone under three heads, viz. "Properties, Varieties, and Places producing it." The knowledge of the characters of minerals displayed throughout this treatise is absolutely miraculous, considering the age that produced it. He actually anticipates by many centuries the founders of the modern science in Europe, Häuy, Möhl, &c., in several points, such as in defining the different species of the Corundum, and in basing his distinctions upon the specific gravity and the hardness of the several kinds.[9]

Marbodus was probably the author of the metrical version, in Norman French, of his 'Lapidarium,' which is found in the same MS., written in a contemporary hand. The universal reception of the absurd science promulgated by Psellus and Marbodus, naturally led to the multiplication of treatises upon stones considered mainly as medicinal or magical agents, and thus has occasioned the loss of the invaluable works of such acute and experienced observers as Sotacus, Sudines, and Zenothemis. To this was added another cause of neglect amongst the Latins: Pliny's condensation of their treatises had produced the com-

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[9] Von Hammer has published a German translation in his 'Mines de l'Orient,' vol. vi. What gives the treatise a special interest is the evident fact that the author drew from the fountain-head of that science, whence the early Greek mineralogists had obtained, though imperfectly, their information. In the text many of these coincidences will be indicated; more especially as concerns the true origin of the ancient *nomenclature* for gems.

plete obscuration of these his predecessors; whilst amongst the Greeks of the same period nothing connected with natural history any longer was cultivated, save what had reference to either magic or medicine. The 'Lapidarium' of Marbodus is the last work professing to treat, however imperfectly, of the natural history of stones. The numerous *Lapidaria* extant in MS., some as old as the 13th century, are of a totally different class, and bid farewell not only to science but to common sense. They treat not so much upon the natural potency of gems, whether "in medicine potable," or, set as jewels, upon the health of the wearer, as upon their supernatural powers in baffling the influence of demons, and the various evils due to the malice of such beings—plagues, murrains, tempests.

But the great object aimed at by these various authors is to define the different virtues of the sigils engraved upon appropriate stones. Here a new class of ideas is introduced, no traces of which are to be discovered either in the 'Origines' or the 'Lapidarium' of Marbodus, although faintly hinted at by Pliny, when ridiculing the impudence of the Magi in ascribing virtues to stones (Amethyst and Emerald) engraved with certain devices. Such new ideas are evidently due to the influence of the Crusades, and the consequent Oriental intercourse, upon the taste of the learned. They were brought in upon the same tide of Arab science that spread the study of alchemy throughout Europe, and were by their nature essentially connected with astrology, now once more cultivated with a zeal unknown before, even under the Lower Empire.

The strange misinterpretations of the most usual classical subjects, as represented on gems, betray so total an ignorance of ancient mythology, that such could never have been broached by the learned of Europe, amongst whom the study of the classics was yet to some extent kept up, and whose writings abound with correct allusions to ancient history and fable. It seems therefore to follow that these misconceptions were borrowed from the Arabians[10] (of Spain for the most part), and similarly from the

[10] For example, the Rosicrucians pretend that their founder, the mysterious A. C., got all his secrets from the Arabian College of Damascus.

Jews of that country, famous then both as physicians and alchemists. In fact, many of the described sigils bear a striking resemblance to the myriogeneses, or symbolical figures representing the influence of the thirty degrees in each sign, translated by Scaliger from the Arabic, in his Commentary upon Manilius. The latter are indeed referred by the astrologers to the ancient Egyptians, but internal evidence discovers that such an ascription is a mere pretence, designed to acquire additional authority for the rules there laid down in connexion with them. That such is far from being a bare assumption appears from the names of the authors 'On Sigils' quoted by *Camillo Lionardo*. This sage (physician to Cesare Borgia) has, in his 'Speculum Lapidum' (written in the year 1502), collected and published all the treatises on the subject that came within his reach. The names, we find, are all such as figure in the library of the alchemist. *Hermes Trismegistus*, as the author of the 'Liber Quadripartitus;' *Chael* (*i. e.* Jael), "a most ancient doctor amongst the children of Israel in the wilderness;" *Ragiel*, in his 'Book of Wings,' a tractate indispensable to all students of magic; *Solomon;* and *Thetel Rabanus*, better known as *Rabanus Maurus*. This last, styled by Camillo "a most ancient doctor," was abbot of Fulda in 822, and the most learned man of the Carlovingian era. As he had made a pilgrimage to the Holy Land (which indeed was the necessary complement to the education of a philosopher at that date), he may possibly have there acquired his knowledge of the science of sigils. From Camillo's remark as to his antiquity, one might infer that the other writers in his company were supposed to belong to a more recent age.

To give a few examples of the mode in which these wizards explained the designs of ancient art, and of the virtues they attributed to the same, on the strength of such interpretation. For as Camillo acutely observes, "All things in nature have a certain form, and are subject to certain influences. Stones therefore, being natural productions, have a certain specific form, and are subject likewise to the universal influence of the planets. Hence, if they be engraved by a skilful person under some particular influence, they receive a certain virtue as though they had been endowed with life through that engraving. But if the effect

intended by the figure engraved be the same as that produced by the natural quality of the stone, its virtue will be doubled, and its efficacy augmented." Thus Ragiel lays down that "a ram or bearded man's head (Ammon) on Sapphire defends from many infirmities, from poison, and oppression. A hoopoe with the herb dragon in front, upon Beryl, hath power to evoke the water-spirits, and force them to speak. It will also call up the dead of your acquaintance, and oblige them to respond to your questions." Again, Chael has "Man with long face and beard, his eyebrows raised, sitting behind a plough, and holding up a fox and a vulture, with four men lying upon his neck—such a stone, placed under your head when sleeping, makes you dream about treasures, and the right manner to discover the same." (This design is the Roman representation, "Quattuor Tempora," the year and the four seasons.) "Man seated, and a woman standing before him, with her hair hanging down loose to her loins; the man looking upwards: this cut on Carnelian hath the virtue that whoever is touched therewith shall be led to do the owner's will immediately" (Hercules and Iole). "Man with a wand in his hand, seated on an eagle (Jupiter), engraved on Hephæstite or Crystal, must be set in a brass or copper ring. Whosoever looketh upon this stone of a Sunday before sunrise shall have victory over all his enemies. If he look upon it of a Thursday, all men shall obey him willingly. But he must be clothed in white, and abstain from eating pigeons." "Goat engraved on Calcedony tendeth to the getting of wealth. Keep this in thy money-box, and thou shalt always be rich." In fact, the country, the birth-place of these fancies, is indicated plainly enough by the circumstance that Camillo quotes several stones by their Arabic names, such as the Kaman, Gagatromeus, Zumeeh, and Ziazia.

In the 15th century Georgius Agricola did something for the natural history of minerals, interspersing notices from his own experience with the rest of his matter drawn from the ancients. In the following century Kentmann and Gesner did something more for science in their little treatises, generally published together. But it was not before the beginning of the next century that a treatise on mineralogy appeared, still retaining any practical value. In the year 1609 *Anselmus de Boot*, Latinised into

Boethius, a native of Antwerp, physician to the Emperor Rudolf II., published his book 'De Gemmis et Lapidibus,' in 8vo., which was reprinted in 1647, with many good notes by Tollius. This edition includes the text of Theophrastus, with a commentary, and another shorter treatise, 'De Gemmis,' by A. de Laet, dedicated to Elizabeth, daughter of the unfortunate Frederic King of Bohemia, and grand-daughter to our James I. Whoever desires to peruse a work breathing in every line the spirit of those times, an extraordinary mixture of credulity with the most extensive and various learning and great practical experience, will be amply repaid for his trouble in going through this book, written as it is in elegant and easy Latin, by the confidant and helper of the imperial alchemist and virtuoso. He displays much critical knowledge in his attempts to identify the gems known to the ancients by names transferred to others in modern times; and it was a satisfaction to find that his attributions for the most part coincided with my own, made from an independent point of view; my researches into that particular having been nearly completed before De Boot's treatise came to my knowledge. In his disquisitions upon the properties of stones he draws a distinction that curiously illustrates the struggle then going on between traditional superstition and common sense. Whilst admitting, and to the fullest extent, all their medicinal virtues as set forth in the mediæval Lapidaria, giving recipes for extracting the "spirit of Emerald," for making the "ointment of Lapis-lazuli," &c., he denounces the belief in their magical powers as equally superstitious and derogatory to the idea of Divine Providence. His notices of the native place of the precious stones, the trade in them, their current value, the modes of working them, and their counterfeits, are admirably given in brief yet comprehensive details, showing a thorough acquaintance with this portion of his subject. As far as regards these latter heads, De Laet's treatise, which was evidently intended for a supplement, as concerns the modern division of the subject, to his predecessor's, is deserving of the highest praise, and has afforded me abundance of information whenever the jewelry of the Renaissance came under consideration. Both treatises have been the source whence subsequent writers on precious stones have drawn all that is valuable

in their pages, and that without acknowledging their obligations: Dutens, for example, whose 'Pierres Précieuses' (1777) is little better than an abridgment of the same articles in De Boot's work. Under his heading 'De Lapidibus,' the geologist will be amused with his clever woodcuts of fossil shells and teeth, and the extraordinary value in the pharmacopœia for which he gives them credit, apparently on the strength of their singularity of shapes, which indicated their service to mankind according to the received "doctrine of signatures."

My own plan in the following pages has been almost the same as De Boot's: to combine the ancient with the modern natural history of the subject—a thing not attempted by later mineralogists, whose writings are either purely scientific, or else consider gems from the point of view connected with the trade in them. My object has been first to establish a sound system of nomenclature in the antique department; to define each species with precision, employing for this end so much of the modern science as was necessary; to consider all these substances in their bearings upon art, and their connexion with the history of the times, for which reasons the two essays on the precious metals have been introduced; and at the same time, and lastly, to supply accurate guidance to the admirer in our own days of these the choicest of Nature's treasures.

ACHATES: Ἀχάτης: *Agate.*

THEOPHRASTUS, in his list of gems used for signets (31), says: "A handsome stone too is the Agate brought from the river Achates (Drillo) in Sicily, and is sold for a high price." But Pliny (xxxvii. 54) observes: "The Agate was formerly in great estimation, now in none at all. Found at first in Sicily on the banks of a river of the same name, but afterwards in a great number of places, exceeding in size, and fruitful in varieties."

The stone meant by Theophrastus had evidently, from the terms he uses, but one sort, but was not the gem now known to antiquaries as the Tricolor Agate, because formed of parallel bands of brown, transparent white, and opaque or nearly opaque black: each band sharply defined and in strong contrast to its neighbour: this being his *ὀνύχιον, q. v.* On such a stone, after the Sard, are found all the best intagli of the early Greek and the Etruscan schools, but hardly ever any works in the peculiar style of Imperial Rome.

The "Agate" in modern mineralogy is an impure variety of Calcedony, presenting the most brilliant and varied colours arranged in opaque wavy lines around a crystalline centre, and on a translucent ground; thus distinguished from Jasper, which, though of much the same nature, is always *opaque* and contains a larger proportion of iron.[1] But the Achates of the Romans comprehended a much larger variety of stones: besides that still known by the name, it embraced the inferior coloured quartz gems, the

[1] Our Agate is well defined by De Boot (ii. 95). "Next in appearance and in colours to the Onyx is the Agate. The Onyx is adorned with zones of colour, the Agate is *not*. For instead of zones it is ornamented by Nature in a wonderful manner with lines or spots of various colours, which exhibit images of different objects; some, for instance, represent, far from obscurely, trees, animals, fruits, flowers, clouds, &c.

common Carnelian, the Calcedony, those now called Jaspers; for the ancient name *Jaspis* was properly restricted to the green and translucent variety, now known as the Plasma and the Heliotrope. How wide the signification of the term "Achates" in ancient times clearly appears from Orpheus (Λιθικὰ, 604), who calls it "the multiform, excellent Achates, invested with every colour: for numerous are the dyes of the Achates to be seen. In it you find, if you look, the glass-like Jasper, the blood-red Sard, and the sparkling Emerald. Amongst them, one of vermilion aspect, moreover a copper colour, and the hue of the summer apple: but best of all that, if you can find it, representing the tawny hide of the fierce lion, dappled all over with spots, red, white, dusky, and green"—evidently the Brocatella. These varieties are all distinguished by Pliny by compound names expressive of the particular shade or conformation of the subject matter. Thus the Jaspachates would be our opaque Green Jasper; the Cerachates the common Calcedony; the Sardachates, the common Carnelian; the Hæmachates, the Red Jasper (abundant in Sicily); the Leuchates,[2] the white Carnelian; the Dendrachates, "decorated with little trees," our Moss Agate. The Corallachates, "besprinkled with gold-dust like the Lapis-lazuli, called the Sacred Agates," is evidently our Aventurine-quartz of a semi-transparent red, filled with gold-like particles of mica. This, Pliny says, was found abundantly in Crete; at present the finest specimens come from Cape de Gatte in Spain. That, amongst these, our Red Jasper was included, appears from the singular notion quoted by Pliny, "that the kind of a vermilion colour rendered athletes invincible; and that the test of it was, if, when boiled for two hours in a pot of oil together with other paints, it should convert the whole mass to its own red colour." The Agates brought from India were greatly admired as lusus naturæ, "because they represented rivers, groves of trees, cattle, and even more defined

[2] And the Cerachates, or waxy agate. That the latter was the common yellowish Calcedony appears from his adding "e cerea staticala et equorum ornamenta." The staticala seem to be those heads and similar ornaments in Calcedony, the perforations in which show they have been attached to the dress, perhaps as weights to the ends of robes to make them set well, like the metal ῥοισκοὶ of the Greek chlamys.

objects, such as chariots, pilasters, and the ornaments put upon horses." All these objects were suggested to the imagination by the singular arrangement of the veins in many of the Jaspers, notably in the "Egyptian Pebble," which frequently presents objects so exactly defined, that it is hardly possible to imagine them the unaided sports of Nature. Thus in the British Museum may be seen the exact portrait of Chaucer in such a pebble; the Strawberry Hill Collection had another of Voltaire; and numerous others might be mentioned, equally illusive.[3] Epiphanius, however, seems to have derived his account of this stone from a much earlier, Greek source, when the name was as yet restricted to one particular species: "The eighth stone; the Agate; this has been supposed to be that called Perileucos, described under 'Hyacinthus.' It is an admirable gem, somewhat blue (or dark) in colour, having externally a white zone,[4] like marble or ivory, running round it: this too is found in Scythia. And amongst these, there is an Agate having the colour of a lion's-skin; this powdered and mixed with water, smeared upon the bite of any reptile, counteracts the poison of the scorpion, the viper, and such like things." Isidorus also (Origg. xvi. 11) makes but one sort of the Achates: "It is a black stone having in the middle circles of white and black joined together and variegated; resembling the Hæmatites." And this is again more closely defined by Marbodus as a black stone girt by a white zone, expressing probably the sense of the first part of Epiphanius's description.

In Roman times, when these stones had gone out of fashion for signets, they were in greater request than ever, on account of their medicinal and talismanic virtues. The singular freaks of Nature portrayed upon their surface had readily suggested to the superstitious Persians, the authors of all such notions, some won-

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[3] De Boot had one no larger than the middle finger-nail, marked with an exact circle of a brown colour, within which was the perfect figure of a bishop in a mitre. On turning the stone a little a second figure appeared; and on again turning it, two more, a man and woman, &c.

[4] Meaning, perhaps, the colourless, transparent band in the middle of the Tricolor-Agate.

derful occult virtue inherent in the substance thus signalled out.[5] Thus Orpheus sings (230) how "if thou wearest a piece of the Tree-Agate on thy hand, the immortal Gods shall be pleased with thee: if the same be tied to the horns of thy oxen when ploughing, or round the ploughman's sturdy arm, wheat-crowned Ceres shall descend from heaven with full lap upon thy furrows." And again (604), how every kind is an antidote to the asp's bite, if taken in wine: but the more potent Brocatella, if merely tied on the wound, cures the scorpion's bite; enables the wearer to gain the love of all women; obtain all his petitions from the powerful; and cure the sick man whose thread is not actually severed by Clotho. And Pliny jestingly quotes the Magi as teaching that, besides these virtues, "in Persia," by burning them, storms could be averted, and thunderbolts to boot: the proof of their efficacy being that, if thrown into a caldron of boiling water, they immediately cooled it; but in order to do good they must be strung on the hair of a lion's mane. The stone coloured like a hyæna's skin they, on the contrary, viewed with horror as the cause of domestic strife. The Corallachates was an antidote against spider and scorpion bites; the Tree-Agate good for the sight.

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[5] Marbodus, interpreting Virgil's 'Fidus Achates' literally, ascribes the escape of Æneas from all his perils to the virtue of this talisman that he always carried about with him.

ADAMAS: Ἀδάμας: *Diamond.*

By this name the earliest Grecian writers did not understand a precious stone, but rather some metal of invincible hardness such as steel, when compared to the more ancient instruments of bronze. Such must have been the "adamantine chains" in which Æschylus pictures his Prometheus bound, the legend about his *iron* finger-ring, memorial of his torture, sufficiently attesting what had been the material of these bonds. In process of time, as the sphere of the arts widened, this epithet seems to have been applied to certain gems more refractory to the engraver than the Sards and Agates generally worked upon by him. Theophrastus does not include the Adamas in his list of gems, and only once incidentally alludes to it (19) as an incombustible substance; probably a stone, since the passage treats of the various sorts of the Anthrax. The first indisputable mention of the Adamas as the true Diamond, containing its most striking characters, minute size, and enormous value, is met with in Manilius (iv. 926)—

"Sic Adamas, punctum lapidis, pretiosior auro."

And this poet flourished in the latter part of the Augustan age. All this fully bears out Pliny's assertion that the Adamas, "bearing the highest value not merely amongst gems, but amongst all human possessions, was long known to none but kings, and to but a very few of *them*." Indeed it could not have been known at all in Europe before a direct intercourse with the nations of Southern India had been brought about by the establishment of a Macedonian kingdom in Bactria. Certain it is that Theophrastus could not by mere oversight have omitted it from his list of gems, if known to his contemporaries, for the

above-quoted passage from Pliny clearly proves that the Diamond, as soon as introduced to the knowledge of the ancients (for his "regibus" necessarily signifies Greek princes), took the same foremost place amongst precious stones that it has ever since maintained.

Pliny thus gives the *ancient* notion as to the nature of the Adamas (xxxvii. 15), "Ita appellatur *auri nodus*,[1] in metallis repertus perquam raro, comes auro, nec nisi in auro nasci videbatur." Here he evidently alludes to the passage in Plato's 'Timæus' (59, B), describing the origin of metals by infiltration and condensation, the theory afterwards adopted by Theophrastus: *τούτων δὲ πάντων ὅσα χυτὰ προσείπομεν ὕδατα, τὸ μὲν ἐκ λεπτοτάτων καὶ ὁμαλοτάτων πυκνότατον γιγνόμενον μονοειδὲς γένος, στίλβοντι καὶ ξανθῷ χρώματι κοινωθὲν τιμαλφέστατον χρῆμα, χρυσὸς ἠθημένος διὰ πέτρας ἐπάγη. Χρυσοῦ δὲ ὄζος διὰ πυκνότητα σκληρότατον ὂν καὶ μελανθὲν, Ἀδάμας ἐκλήθη.* ("Of all these elements, designated by us liquids in a state of flux, that from the finest and most homogeneous particles becoming the most condensed, a special kind distinguished by its shining and yellow colour, that most precious thing gold, after filtering through the pores of the rock, becomes condensed and solid; whilst the *germ of the gold*, excessively hardened and dark-coloured by reason of its density, has been termed the *Adamas*.") The epithet *μελανθὲν*, "dyed a dark blue," sufficiently indicates that Plato understood nothing more than our Sapphire by his Adamas, Theophrastus using the same word to designate the colour of the Occidental Turquois.

Some mineralogists have advanced the paradox that the Adamas of the *Romans* also was not the Diamond, but the Sapphire.[2] A sufficient answer to this is, that such large Sapphires as the ancients frequently engraved (the signet of Constantius, for

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[1] "The germ of gold."

[2] The Adamas of Theophrastus may have been the Emery-stone. There is an analogy in the word *Samir*, of which the Rabbinical legend is told that with the blood of the worm so called Moses engraved the Stones of the Rationale; whilst others render *Samir* by *Adamas*. Now there can be no doubt that Samir and Smiris are forms of the same (Persian) word.

instance, weighing 53 carats) could not be termed "punctum lapidis:" and besides this, the latter stone could not have been engraved by means of its own fragments. The Sapphire, too, usually occurs in masses of considerable relative size, especially the white sort, supposed, according to this theory, to represent the Adamas, and these are mostly found rounded and pebble-shaped; of a form, in short, to be described by anything better than the term "punctum."

It is, however, impossible to mistake Pliny's true meaning, especially if a little attention be paid to his admirably chosen comparisons exemplifying the characters of the gem. "The Indian appeared to have a certain affinity to Crystal, being colourless and transparent, having six angles, polished faces, and terminating like a pyramid in a sharp point (laterum sexangulo lævore turbinatus in mucronem); or also pointed at the opposite extremities, as though two whipping-tops[3] (turbines) were joined together by their broadest ends." A wonderfully compact summary this of the distinctive features of the Diamond, for the "six angles" can only belong to an octahedron, the primary form of its crystallisation; the "two pyramids joined together by their bases" expressing the case where the octahedron is perfect; and the "natural polish" marking those small Diamonds, perfectly crystallised, called "Naifes" by the Indians, completes the picture. These Indian stones, the largest known to the Romans, attained the "size of a hazel-nut *kernel*," or about 3 carats' weight.[4] This comparison was not selected at random; it is more full of meaning than at first sight appears, and affords the aptest possible illustration of the idea. Pliny's "nux avellana," the *nocciuolo* of the Italians (so called to distinguish it from the proper *nux*, *noce*, a walnut), is the kind known in England as the Barce-

[3] The ancient shape of this toy was a many-sided pyramid, inverted.

[4] Why the Romans could obtain no larger stones is explained by M. Ben Mansur's noticing that in India, where the diamond is greatly sought after, its exportation was formerly prohibited. This embargo probably only applied to stones above a certain weight, for we find, in Gar. ab Horto, that all stones found in the washings above 30 mangelis (37½ c.) were claimed by the sovereign, and the secretion of such punished by the confiscation of all the offender's property. And De Laet (1647) says that the old mines of Golconda (then stopped working) used to be let on lease, with the reservation of all stones above 10 c. for the king.

lona nut, the kernel of which, as every one must remember, is of an obtusely conical form, precisely that assumed by the Diamond in its secondary shape, when the edges of its faces are converted into flat planes. Nothing could be more appropriate than this simile to convey to his reader's mind the exact appearance of the antique Diamond, as worn by the enviable possessor (the finishing touch to his magnificence), with its base embedded in the massy gold of the ring. The *Lasque*, thin, flat, and oval, where all the angles have disappeared, is evidently his Ethiopian, the size of a gourd-seed, and of a somewhat similar colour,—a pale yellow. This, it is especially remarked, was the *only* kind known to the earlier mineralogists, studied by Pliny, and was said to be found near Meroe in Ethiopia; but Ethiopia was a vague term for the remotest East, and the Egyptian Meroe was confounded with Mount Meru in Hindostan. The Macedonian found in the gold-mines of Philippi was also a Lasque (cucumis semini par). The Arabian resembled the Indian in all respects, but was smaller. The Androdamas had a silvery lustre, like the Adamas, but was always square, and resembled a die in shape. Here we have the cubic crystal, the faces of which are never polished, but covered by a semi-opaque striated varnish. Lastly, the "Cenchros" is described as like a millet-seed; or the spherical, an abnormal form where the crystallisation radiates from the centre, preventing all artificial polish, and hence designated Bort (Bastard, in Provençal), from *Abortus*.[5]

Of the six kinds into which Pliny divides the Adamas the four above described are doubtless all forms of the true Diamond. The minute size is enough to demonstrate this; for how else could inconspicuous stones have been so highly valued—stones, too, whose minuteness can only be exemplified by the comparison to a gourd-seed or a grain of millet? But, besides these, two kinds remain rejected by Pliny himself as "degenerate, and pos-

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[5] Pliny's *Chalazias*, "of the form and colour of a hailstone, but as hard as the Adamas, and which retained its coldness even in the midst of fire," must have been the cubic form with the edges rounded off. No other comparison could so exactly represent this modification of the crystal—its irregular surface, and its icy colour, obscurely white.

sessing nothing of the Adamas but the honour of the name." These were, the "*Cyprian*, of a bluish tinge (vergens in aërium colorem), most valuable as an amulet,[6] and the *Siderites* of a steely splendour, and exceeding all the others in *weight*." Both these were Sapphires, as their blue or grey colour, and greater specific gravity, prove, coupled with the remark that both could be drilled by means of another Diamond, *i. e.* a true one. It is a singular coincidence that Epiphanius (a Cyprian bishop, by the bye) describes the Adamas as of a sky colour (ἀεροειδὴς). This, according to him, formed the "Declaration" or Urim and Thummim worn over the high priest's breastplate; "the change in the colour of which, when he came out from the sanctuary, manifested the favour or anger of Jehovah." Certain stones were used in jewelry a century ago under the name of "Diamonds of Baffa" (Paphos), but the remembrance of what they really were is now entirely lost in the trade; some conjecturing them to have been Jargoons, others only crystals. Lessing, however, was inclined to consider them as something more akin to the real stone than either of these. Pliny remarks that the Diamond is the companion of gold, and seems only to be produced in gold itself. He is here correct, though perhaps it may be but by an accidental coincidence; for all the Diamond-mines, the discovery of which is recorded, have been brought to light in the pursuit of alluvial gold-washings. This was notably the case with the famous mines in the Serra do Frio, the oldest in Brazil, and the most productive in the world. Australian "diggins" have already furnished a few, and will probably yield a vast supply when their gravel comes to be turned over by people having eyes for other objects than nuggets and gold-flakes. The British Museum, amongst the native Diamonds, exhibits an octahedral Diamond attached to alluvial gold; and, strange confirmation of the ancient idea as to their affinity, the primary crystal of that metal also is the octahedron.

The Romans, taught by the Indians no doubt, valued this gem entirely on account of its supernatural virtues. Pliny, and this

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[6] Here we have the source of the tradition as to the Jewish Δήλωσις, given by Epiphanius.

time without his usual sneer at the Magi, says that it baffles poison, keeps off insanity, and dispels vain fears, and hence takes its title of Anachites.[7] It was not recommended to them by its beauty, for, with the rare exceptions of the "Naifes," the surface of the best is coated by a dull greenish varnish; hence, strange expression to our ideas where the Diamond is the type of light and lustre, Isidorus speaks of the Indian Diamond as being a little stone, and devoid of beauty, "lapis parvus atque indecorus." Never attempting to polish, even in the same inartificial manner as their other hard gems, much less to engrave upon it, for which the minuteness of the specimens known to them unfitted it, the Romans wore the crystals in their native form. A magnificent example is afforded by the clasp of Charlemagne's mantle, set with four large stones, the legacy doubtless of his imperial predecessors.[8]

A few rings also have come down intact to our times, which show what was the appearance of the one set with the

> "Adamas notissimus et Berenices
> In digito factus pretiosior,"

that graced the finger of the imperious lady in Juvenal's days; the stone being prized not for its beauty, but its rarity and invaluable virtues as an amulet. The Herz Collection possessed a well-formed octahedral Diamond, about a carat in weight, set open in a Roman ring of unquestionable authenticity. The Waterton Collection, in its almost unlimited extent, comprising the rings of all nations and ages, furnishes a yet finer example of the Diamond in its original setting; a ring apparently dating

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[7] He here seems to have Orpheus in view (190), "a stone full of wondrous milk—whence the ancients have termed it the Anaktites Adamas, because it bends the minds of the gods, so that they respect their offerings and take pity upon mortals. They have likewise called it Lethæan, because it prevents both mortals and immortals from thinking of their sorrows and evils. Others bid us call it the Galactites, for, if one rubs it, a liquor exactly like milk exudes therefrom." Pliny's *Galactites*, however, was a soft stone, brought from the Nile, tasting like milk and melting in the mouth. But, adds he, some gave this name to an emerald surrounded by three white lines. The first must have been the pure carbonate of lime, the Berg-milch of the Germans.

[8] Long preserved in the treasury of St. Denys.

from the Lower Empire, for the head is much thrown up, and has the sides pierced into a pattern, the "opus interrasile," so much in fashion during those times. It is set with two diamonds of (probably) a carat each, one a perfect octahedron of considerable lustre, the other duller and irregularly crystallised. Another such example might be sought for in vain throughout the largest cabinets of Europe.

Pliny retails a "jewellers' story" as to the infrangibility of the Diamond, which was only to be overcome by first steeping it in goat's blood, and thereanent indulges in certain profound reflections upon the doctrine of Antipathies; adding that such a discovery could never have been guessed by mere mortal ingenuity, but must have been the express revelation of Heaven. M. Ben Mansur also gravely states that a Diamond laid upon an anvil, and struck with a hammer, instead of breaking, is driven into the anvil; and that the only resource is to wrap it up in lead, and then to hammer it, or else enclose it in wax or turpentine; expedients in reality resorted to, as one can well suppose, in order to prevent the precious splinters from flying about and being lost.

This infrangibility was naturally in people's minds the concomitant idea with the hardness of the gem already established; that, and resistance to violence, being considered as inseparable; and besides, the experiment was too costly to be ever tried. But in reality, this gem being composed of infinitely thin layers deposited over each other in a direction parallel to the faces of the primitive crystal, it can easily be split by a blow of a knife in the direction of these laminæ. This property had been discovered long ago, even in the 16th century, but then looked upon as the chimera of a visionary, for De Boot (1609) says that he knew a physician who "boasted that he by a singular artifice could stick a diamond upon the point of a needle; and moreover, without the aid of any instrument or material, other than those furnished by the human body, divide it into fine scales like a piece of talc:" a comparison which attests the truth of his boast. The arcanum, however, like many other valuable mediæval recipes, died with the discoverer, until Dr. Wollaston again hit upon it, and made thereby some profitable speculations by purchasing large diamonds at a low price which had been rejected by

the jewellers on account of their bad shape and fulness of flaws, and skilfully subdividing them into smaller and perfect crystals.

It will naturally be asked why the ancients should have ever desired to reduce to fragments so rare a possession: but Pliny supplies a sufficient motive: "When by good luck they succeed in breaking it it flies into such small scales (crustas) that they are scarcely visible. These are in request with gem-engravers, and are mounted in iron tools,[9] there being no substance so hard that they cannot hollow out with the greatest ease." We must, however, suppose that they used for this purpose only the Lasque and the Bort, stones of an ugly form, and too dull to serve as ornaments; just as in our day these kinds are pounded up to make the diamond-dust used by lapidaries. The Romans, however, did not employ the stone in the form of diamond-dust, but the sharp fragments were mounted singly in an iron handle, and managed much in the same manner as the graver in cutting a design on steel; hence the great freedom of touch characterising true antique work on gems, where the artist has evidently cut away the material with an instrument obstructed by no resistance. Natter, himself one of the most distinguished gem-engravers of the last century, justly particularizes the general use of the diamond-point in an intaglio as the grand criterion that distinguishes the antique from the modern. The ancient artist having sunk his design into the gem to the depth required by the means of a blunt drill charged with emery-powder, put in all the finishing strokes, the features, the hair, the drapery, with his keen diamond-point; the modern executes the same work in a tamer, more mechanical manner, by the edge of a rapidly revolving disk or the point of a drill, made cutting by a coat of diamond-dust and oil, and turned like a lathe by a fly-wheel, whence the name of the machine. Before the introduc-

[9] An invention of the remotest antiquity. "The sin of Judah is written with a pen of iron, with the point of a diamond; it is graven on the table of their hearts" (Jer. xvii. 1.)—aptly rendered by the Vulgate "stylo ferreo puncto adamantis." But the *Adamas* of the Babylonians and Egyptians must have been the *Corundum*.

Flavio Serletti, of Livorno, soon after the year 1700, is believed to have been the first to revive (at Stosch's suggestion) the use of this ancient instrument, and by its aid to have rivalled the most famous masters of antiquity. (See Giulianelli's account of him.)

tion of the true Diamond into Greece, sharp fragments of Corundum obtained from Naxos served the same purpose: the name Adamas was then doubtless confined to the blue and grey Sapphires found in Cyprus, or to the opaquer crystals of Corundum discovered in the emery-mines. Such a stone reduced to sharp fragments would serve to cut into and excise the Quartz gems, Sards, Agates, Jaspers, then in request as signets, with almost as much facility as the Diamond itself. In fact, the amorphous Corundum used from time immemorial by the Indian lapidaries for cutting the hardest gems was known when introduced into the European atelier, some ninety years ago, by the name of *Adamantine Spar*. That some such mineral must then have represented the Adamas is a necessary consequence of the established fact that works apparently executed entirely by the Diamond-point and others with but little assistance from the drill, belong for the most part to the archaic period of Greek art, some ages before the true Diamond could have found its way thither from India. Similarly within the last few years the Diamond-dust has been superseded in Paris by the Carbonado, a black substance of the same chemical nature, but found in Brazil much more abundantly, the masses attaining to 1000 carats in weight. This, besides being employed in powder, is fashioned, says Barbot, into a kind of graver (burin) designed to act most efficaciously upon the hardest gems.

It was not before 1475 that the art of cutting the Diamond into a regular form so as to bring out all its lustre was invented by Louis de Berghem (or Berquem), although Laborde[1] has discovered mention of the "tailleurs de Diamants," and one Herman designated a skilful workman, established in Paris in 1407, and also three "diamant-slipers" at Bruges in 1465. But the very designation of these last shows that their profession extended no further than the polishing the stone, or removing the greenish film that veils its transparency, and this might be effected by emery-powder alone by a very tedious though effectual process. L. de Berghem tried his newly-invented art upon three large

[1] See the next article, "Diamond Cutting," where Laborde's arguments will be found fully stated, and, as it appears to me, refuted.

diamonds intrusted to him by Charles the Bold: the first a deep stone[2] (afterwards confounded by all tellers of the story with the famous Sancy); the second of a flatter shape, a present to Sixtus IV.; the third, an irregular crystal, he cut into a triangle, which the Duke had set in a ring representing two clasped hands, the symbol of good faith, and sent to Louis XI., an allusion, though in an acceptable form, to his deficiency in that virtue. The improvement in the beauty of the stones produced by this new fashion was so conspicuous, that Charles rewarded the inventor (according to his descendant Robert de Berquem) with the munificent donation of 3000 ducats. The exact style of cutting thus introduced may yet be seen in numerous jewels of the next century. The only patterns known to Kentmann in 1562 are the "Demant-punkt" and the "Demant-tafel." The first, the "Point," is merely a four-sided pyramid, produced by simply polishing the faces of the native crystal, and making them exactly true and regular. The second, the "Table," required much more work, the point of the crystal being ground down to a square or oblong plane; the opposite extremity was likewise reduced to a plane, but of much smaller extent; and the sides were brought to a right angle with each other: this proportion being observed, that the width of two sides added together should equal that of the upper plane surface. But if the stone were a Lasque (a flat and thin parallelogram), then the lower part was dispensed with, and the Table consisted of no more than the top with the upper sloping sides, and nothing was left below the setting. De Boot (1609) observes that, though the Points were the most frequently seen (which the view of any collection

[2] Mariette says, quoting Lambeccius, that the *first* diamond subjected to the new process by Charles was of a deep form, and was cut into a pyramid. This the Duke wore as a pendant to a chain set in the centre of 3 balais and 4 great pearls. Captured in the plunder of his tent at Granson, it was sold by the Swiss to the Fuggers, by them to Henry VIII., whose daughter Mary made a present of it to Philip II. of Spain. Mariette thinks it still remains, though re-cut, amongst the Spanish regalia. It is accurately figured by Lambeccius in his Bib. Imperialis (ii. 516), from J. J. Fugger's drawing of the actual size. Of this, the most famous of all diamonds known, and the source of innumerable fables, a short and authentic history and description is given at the end of this article, which, it is hoped, may serve to dispel some of the confusion now reigning on the subject.

of Renaissance jewels will confirm), yet the Table was considered of much higher value. The "Rose," a hemisphere covered all over with little facets, was probably invented in the middle of the 17th century under the auspices of Cardinal Mazarin;[3] the "Brilliant" at the end of the same century by Vicenzo Peruzzi, at Venice, who by experiments on coloured stones discovered what are now considered the true principles of cutting the Brilliant (Brillant Récoupé), the ancient deep Table, but with 32 facets above and as many below the girdle of the stone. These technical terms are explained under the proper head "Diamond-cutting."

The misplaced ingenuity of the Cinque-cento artists, ever seeking glory by the overcoming of difficulties held insuperable, speedily distinguished itself by producing intagli upon the Diamond. Although many of the works celebrated under this name may have been in reality cut in the White Topaz or the colourless Sapphire, yet Clusius, a most competent judge, speaks to the fact that Clement Birago had engraved on a diamond the portrait of Don Carlos, a betrothal present to Anna, daughter of the Emperor Maximilian II., and seen by Clusius during his stay in Spain in 1564. Birago had similarly engraved the arms of Spain as a seal for the same ill-fated prince.[4] Raspe quotes (p. 590) a head of Posidonius the philosopher in the Bedford Collection, which he ascribes to the Cav. Costanzi, "who distinguished himself by many engravings upon Diamond, almost all of which are now in the cabinet of the King of Portugal." Herz

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[3] This is Laborde's opinion, but must be accepted with all the reserve due to his national penchant for arrogating every discovery in the art to some Parisian inventor. In all likelihood it was an Italian improvement on the Indian fashion. We shall see further on, before 1665, Borghis, a Venetian, cutting Aurungzeb's famous "Mogul" into a true *rose*.

[4] Paolo Morigia, in his 'Nobiltà di Milano,' states that Trezzo discovered the method, and engraved the arms of Charles V. on a diamond. Birago, his pupil, engraved the portrait of Don Carlos, the Prince of Spain. Gorlacus, a contemporary, in the preface to his 'Dactyliotheca,' published first in 1601, makes the same statement of Trezzo's (Treccia) having engraved on diamond Philip's arms. Gori (Hist. Dactyl. 186) says that *Jacobus Thronus* (probably a Hollander from the name) engraved on a diamond, "eximia arte," the arms of Queen Mary of England, Philip's consort.

describes in his catalogue of the Hope Collection two engraved Diamonds, one a large Table with the bust of the Emperor Leopold I., well executed, and the intaglio highly polished within; the other the head of a philosopher, but a very inferior production to the first mentioned. On account of Herz's profession (of a Diamond-merchant) his opinion may be considered decisive in a question of this nature. A competent judge has besides assured me that the Mayer Collection also possesses a head of Leopold on a true Diamond, a large Table, probably the identical stone seen by Raspe in 1772 in the hands of M. Israel of Cassel.[5] In Her Majesty's collection of Camei and engraved gems is preserved the signet of Charles II. when Prince of Wales, the ostrich plumes between C. P. well engraved upon a large yellow Diamond, a Table formed as a six-sided shield.

The Romans in their estimation of this gem were guided by the Indians, who have ever given it the first rank amongst jewels; the Persians, however, in the 13th century, placed it fifth, after the Pearl, Ruby, Emerald, and Chrysolite. Cellini ranks it in his Table of Values after the Ruby and the Emerald, and only at the eighth of the price of the former. Garcias ab Horto writes in 1565, "The Diamond is considered the king of gems, on account of the hardness of its substance; for if we look to *value* and beauty, the Emerald holds the first place, and the Ruby (if clear) the next." The art of Diamond-cutting seems even at that early period to have been established in India, for Garcias remarks that the Indians set a high value upon the Diamonds of the "Old Rock," especially those perfectly finished by the hand of Nature, called by them "Naifes;" for, say they, "as much as a virgin is to be preferred to a woman already deflowered, so much is a Diamond perfected by Nature superior to one polished by human art. But the Portuguese hold the contrary opinion, and set a far higher value upon the artificially cut gems." Again, the antiquity of the Indian method of Diamond-facetting may be inferred from the fact that when Tavernier visited the Raolconda mine (1665) he found a multitude of

[5] The gems of the Prior Vaini, added by Gaston dei Medici to the Florence Cabinet, include several heads on diamond and on ruby.

Diamond-cutters at work there, each furnished with a single wheel of steel, the size of a dinner-plate. They operated upon but one stone at a time, but worked rapidly, having Diamond-dust *à discretion*. If the rough stone were clear, they did nothing more than polish its natural faces, in order not to lessen the weight; but if it contained flaws or black and red specks, they covered the gem *all over* with facets to disguise them. So invariably was this the rule, that Tavernier as soon as he saw a facetted Indian Diamond was certain of its defectiveness. It is contrary to the Hindoo nature to suppose that they had learnt this art from Europeans, who themselves had only commenced to facet the newly-invented Rose some 20 years before; and had the method been a new introduction at the place, the careful Tavernier would certainly have noted it down. But the Koh-i-noor,[6] which has been known from the remotest antiquity (from 3000 B.C. pretend the Hindoos, being a jewel of Karna, that most ancient king of Anga), was in its original condition as brought to this country covered with little facets curiously arranged around its circumference, encircling the base of an extremely depressed four-sided pyramid.

DIAMOND MINES.

We find in the ancients few indications as to the particular locality of India that supplied them with the Diamond; Pliny says merely, at random, the gem-producing rivers are the Acesines (Jenaub) and the Ganges. Dionysius Periegetes enumerates the Diamond amongst the numerous gems (the Beryl, Green Jasper, Topazius, Amethyst) picked up in the river-beds by the natives of India, as anciently understood, lying to the east of Mount Parapamissus, and Ariana. Ammian (xxii. 8, 30), writing in the 4th century, mentions the region of the Agathyrsi beyond the Sea of Azov as abounding in Diamonds: "apud quos adamantis est copia lapidis." He may refer to the washings in the

[6] The fame of the Koh-i-noor had perhaps reached Europe in the 16th century, for De Boot (ii. 5) observes that the largest stone ever found was that mentioned by *Monardes* as weighing 187½ carats.

Ural Mountains. There is actually a false Diamond found plentifully in Siberia, the use of which is interdicted to the Russian jewellers under the heaviest penalties. All that the usually well-informed M. Beñ Mansur knew of the Indian Diamond Mines was the fable that "in the Eastern part of India there is a deep valley inhabited by serpents,[7] where the Diamond is produced; but some believe it to be found in the mines of the Jacut."

The earliest authentic account of them is to be found in the little treatise, 'De Arom. et Simp. Historia,' written in Portuguese by Garcias ab Horto, in 1565, in the form of dialogues; a Latin abridgment of which was published by Clusius two years later. This writer had been physician to the Viceroy at Goa, and had occasionally been called in by the Nizam-moluco (ul-Mulk), ruler of the Deccan, who had offered him 40,000 pardaõs[8] a year to reside permanently at his court. His account represents in all probability pretty nearly the same state of things as when the Roman traders from Alexandria made their annual voyages to Baroche upon that coast. "Diamonds are found in only three or four places. In the province of Bisnagar there are two or three rocks that produce them, which brings in immense gain to the king of that country, as every stone above the weight of 30 Mangelis (150 grains) belongs to the sovereign. There is another rock in the Deccan, not far from the territory of the Imadixa (Imad-shah), or Imad-moluco, but within the lands of a certain native prince, which produces excellent Diamonds, though of smaller size. These are the stones known by the name of 'Diamonds of the Old Rock,' and are brought for sale to Lispor, a town of the Deccan, where there is a famous market. The Gazerat merchants buy them there, and bring them to us at

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[7] This in its origin is the same story as that reported by Sotacus concerning the Draconția, found in the serpent's brain, colourless and transparent (candore translucido), and admitting of no further polish or improvement from art. Sotacus had himself beheld this gem on the hand of "The King;" and being quoted "as a most ancient author," probably gives us here the earliest notice of the true Diamond. The 'Periplus of the Red Sea' has merely, "To Barace (Barcellore) are brought various and numerous kinds of lustrous gems, the *Adamas*, the Hyacinthus, &c.," but no mention of the actual situation of the mines.

[8] A coin current at Goa, equal to half-a-crown English; the same as the early native rupee.

this place (Goa). They even carry them as far as Bisnagar, tempted by the great profit. For these stones, naturally polished, and called 'Naifes' by the Indians, are infinitely preferred to any others. There is another rock on the sea of Tanjan, in the Malacca country, which yields Diamonds, also called 'Diamonds of the Old Rock,' of small size but fine quality. One fault they have, they are very heavy, which makes them more liked by the sellers than by the buyers."

The same careful investigator of Indian productions notes Pliny's assertion as to Diamonds being found in Arabia as altogether unfounded. But there is little doubt that the Sabæans of South Arabia were a Hindoo race, there settled for purposes of trade, like the Banian merchants, who nearly engrossed all the trade in precious stones in Tavernier's age. These obtained gems of all kinds from India itself, and, pursuing their business, passed over incredible distances; and were to be found domiciled in places where they were least to be looked for.

"It seems to me," says Garcias, "quite a miracle that these gems, which might be expected to be produced in the deepest bowels of the earth, and in a space of many years, should on the contrary be generated almost on the surface of the ground, and come to perfection in an interval of two or three years. For in the mines, this year for instance, at the depth of a cubit, you will dig and find Diamonds: let two years pass, and mining in the same place you will again find Diamonds. But it is agreed that the largest[9] are only found under the bottom of the rock." De Laet in 1647, after quoting the above with a few explanatory remarks, adds: "But in former years, as I have been informed by some English merchants, the richest mines were at Golconda, on the gulf of the Ganges, about 108 miles from Masilipatam. These used to be farmed out for 300,000 pagodas per annum (150,000*l.*), with the reservation of all above ten carats for the

[9] The largest Garcias had *seen*, himself, weighed 140 Mangelis (175 car.); the next to this 120 Mangelis (150 car.); but a credible person had informed him that he had seen one at Bisnagar as large as a small hen's egg. It is quite unaccountable why De Boot should quote the first mentioned as of 187½ car., citing Monardes instead of Garcias. It seems as if he had heard of the Koh-i-noor; it being scarcely probable that two stones should be coexistent of that extraordinary weight —agreeing within one carat.

royal treasury. But these works were stopped by the king's order in 1532, either through fear the stones should become too common and cheap, or, as others say, because the Great Mogul[1] had demanded an annual tribute from the king of Golconda of three pounds by weight of the finest stones found. The most likely reason however is, that the mines were already worked out. An Englishman, William Methold, says that he had visited these mines at the time that they employed some 30,000 labourers, some in digging, some in baling out the water by hand, having no mechanical contrivances for that purpose. They sunk shafts 10 or 12 fathoms deep, and carried out the earth, which was red, mixed with white and yellow chalk, to a place levelled to receive it: and when dried by the sun broke it small and sifted it. Sometimes, though very rarely, they obtained stones of from 120 to 200 carats; many of from 10 to 15 carats; but by far the largest number so excessively minute, that from 8 to 20 of them put together would only weigh a single carat."

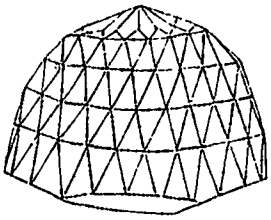
India now sends no Diamonds to the market; but a few, and of the best quality, still come from Borneo. The mines of the Sierra do Frio, Brazil, have ever since their opening in the year 1727 supplied the world, and are computed to have yielded in that time the incredible quantity of over two *tons* of this precious article. The Dutch, who previously had the monopoly of the Indian trade, endeavoured at first to discredit the Brazilian stones as spurious, so that it became necessary to send them to India and re-export them to Europe in order to give them a character.[2]

FAMOUS DIAMONDS.

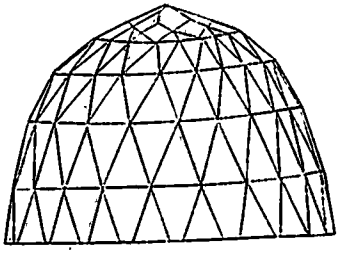
Incomparably the largest, *authentic*, specimen ever yet discovered, was that known as the "Mogul;" found in the mine called

[1] Baber had founded the Mogul Empire in the years 1526-8.

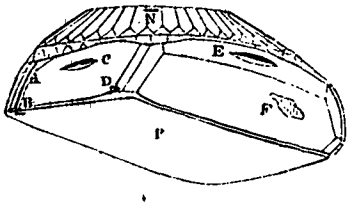
[2] In July, 1863, the Bank of Lisbon sold to the amount of 1,800,000 fr. of rough diamonds out of the collection brought back from Brazil by John VI. in 1821. M. Bernard, of the Imperial Diamond-cutting Establishment, Paris, bought four lots for 1,500,000 fr. (60,000*l.*). There yet remain to the Portuguese Crown rough diamonds valued at 35,000,000fr. (1,400,000*l.*).



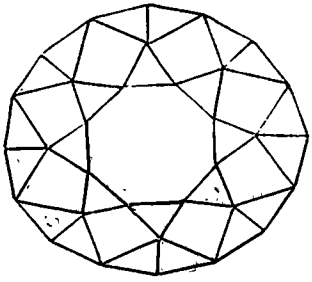
The Orloff, 193 c.



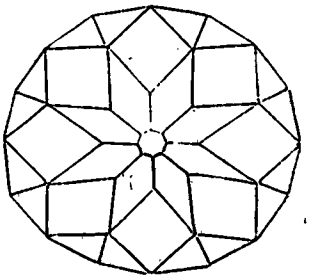
The Grand Mogul, 280 c.



Koh-i-noor, Indian cut, 186 c.

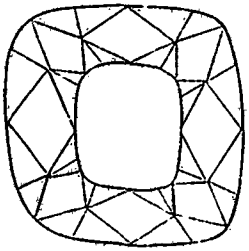


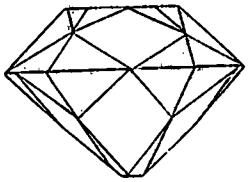
Upper surface.



Under surface.

Koh-i-noor, recut, 102¼ c.





The Regent, 136⅞ c.

To face p. 35.

by the Indians Gani, by the Persians Coulour, seven days' journey distant from Golconda. Its weight in the rough when presented, a few years after its discovery, to Shah Jehan by Mirgimola (Meer-Jomlah), who stole it from his master the king of Golconda when he fled to the Mogul's Court, is said to have been 787½ carats; but full of flaws. To get rid probably of these, the Venetian Hortensio Borghis, the imperial jeweller, cut it down to 280 carats, making it a perfect Rose, with an extremely high crown or apex. It was then "of fine water, with but one crack on the lower edge, and one little flaw inside." But the Mogul was so vexed at this lamentable diminution of the weight, that, instead of paying Borghis for his labour, he fined him 10,000 rupees; all he was worth. This Diamond was exhibited, together with the other regalia, to Tavernier (Nov. 1, 1665), in the presence of Aurungzeb himself, "with the utmost solemnity and deliberation, the Indians considering nothing so unbecoming as haste in matters of importance." Tavernier, after examining and weighing it with the greatest care, gives a faithful drawing of it (Voyage, ii. p. 372). This also fell a prize to Nadir Shah on the sack of Delhi (1739), and is supposed by Barbot to be still amongst the Persian Crown jewels, and to figure there as the stone designated the "Deryai Noor" (Ocean of Light). This Mogul Diamond is often confounded with the Koh-i-noor, and the same traditions as to its discovery, fortunes, and influence, are told of both indiscriminately. But Tavernier had no knowledge of the latter, else he could not have avoided describing so remarkable a stone: probably it came into Aurungzeb's possession at a later period. Besides the greatly inferior weight (186½ carats), it was also an Indian-cut stone; whereas the Mogul was a perfect example of the newly-invented European pattern, the Rose. Other celebrated stones are—

The Orloff Diamond, weight 193 carats, set in the top of the Russian Imperial sceptre, and said to have been formerly one of the eyes of the Idol at Sheringham, whence a French soldier stole it. This exactly resembles the Great Mogul in form and cutting: a very extraordinary coincidence, if the Orloff were actually Indian-cut. Catherine II. purchased this for 90,000*l.*, and an annuity of 4000*l.*, with a patent of nobility to boot.

The Nizam's Diamond, weight 340 carats, is somewhat almond-shaped, almost intact, though an attempt has been made to shape it into the mystic *Yoni*, probably to be placed in the hand of a statue of Parvati, goddess of fecundity. This stone was broken into two in the year of the Sepoy mutiny. I have seen a cast of it in the British Museum.

The Raja of Mattan's is said to be of the finest water, and to weigh 367 carats (uncut most probably). Lowe ('Sarawak,' p. 28) was informed by a party professing to be a competent judge, that he had examined this renowned stone, which is actually in the possession of the present Raja: it is egg-shaped, with an impression on one side. But, adds he, to strangers a mere bit of crystal is shown in its stead, out of fear of exciting the cupidity of the Dutch at Pontiniak, who, having already stripped this unfortunate prince of his lands, would seize upon this last relic of his fortunes, if assured of its genuineness. Hence this matter is still dubious.

The "Regent of France" (weight in the rough 410 carats) was bought by Gov. Pitt of the dealer Jamchund for 12,500*l.* To cut it into a perfect brilliant occupied two years, at a cost of 5000*l.* The Regent Orleans paid for it 135,000*l.* Its present weight is 136⅞, and it is the most perfect brilliant in existence, and therefore as yet, for shape and water, is without a rival. It was found at Parteal, 45 leagues south of Golconda. (The fragments cut off in the shaping were valued at 3000*l.* or 4000*l.*, thus nearly paying for the cutting.)

The cutting of the Koh-i-noor is said to have cost 8000*l.*, by the "improved process," a small steam-engine being employed, and workmen brought over from Holland. A most ill-advised proceeding, which has deprived the stone of all its historical and mineralogical value; for as a specimen of a monster diamond whose native weight and form (186 carats) had been as little as possible diminished by art (for the grand object of the Hindoo lapidary is to preserve the weight), it was unrivalled in Europe; and giving in their stead a bad-shaped, shallow brilliant, of but inferior water, and only 102½ carats weight.

NATURAL PROPERTIES.

The Diamond is highly electric, attracting light objects when heated by friction; and alone amongst gems has the peculiarity of becoming phosphorescent in the dark, after long exposure to the sun's rays. The Romans attributed magnetic powers to the Diamond in a much higher degree than to the Loadstone; so much so that they believed the latter was totally deprived of all its power in the presence of the Diamond; but this notion is quite ungrounded. Their sole idea of magnetism was that of attraction: seeing therefore the stone possessed this for certain objects, the step to ascribing to it a superiority in this, as in all other respects, over the Loadstone, was easy to their lively imaginations, unfettered by experiment. This connexion of ideas is still preserved in the French word for Magnet, "Pierre d'Aimant," from the low Latin "petra de Adamante," which in another form gives "Diamant." The Orientals, improving upon this notion, assigned to the Diamond a discriminating magnetism consistent with its pre-eminent dignity; for M. Ben Mansur states, "The Diamond has an affinity for gold, small particles of which fly towards it. It is also wonderfully sought after by ants, which crowd over it as though they would swallow it up."

Though an antidote against all poisons when worn on the finger, yet during the Middle Ages it was considered the most deadly of all if swallowed. This is laid down as an indubitable fact by that famous physician Camillo Leonardo, in 1504. Thus Cellini tells how his life was preserved from the machinations of his enemy P. L. Farnese by the roguery of the apothecary, who, being employed to pulverize a diamond intended to season the artist's salad, substituted a bit of beryl in its stead. It is likewise enumerated amongst the poisons administered to Sir T. Overbury when a prisoner in the Tower. Garcias takes some pains to overthrow this long-established opinion, by quoting instances of slaves in the mines swallowing large diamonds, for the sake of embezzling them, without the least injury to their stomachs: and a woman (in a case known to him) had administered doses of diamond-dust for many days continuously to her

husband labouring under a dysentery (apparently on the homœopathic principle), without producing the slightest effect.

CHARLES THE BOLD'S DIAMOND.

J. J. Fugger has left accurate drawings (made 1555) of the Ducal jewels purchased by his great-uncle Jacob Fugger from the Bernese,[3] which Lambeccius has well engraved (Bib. Imp. ii. 516). The famous "big, deep, pointed Diamond, talked of all over Christendom" ("der grosz und dich spitzig Diemandt vom dem in der gantzen Christenheit gesagt ward"), is cut as a pyramid, ⅛-inch square at the base, the apex formed as a four-rayed star, each ray coinciding with the centre of a face of the pyramid—a most singular design, but totally foreign from any idea of facetting. It is quite clear that Berghem's invention extended no further than this, with the reducing the sides of the native Diamond into a regular form, and equal to each other. The three Balais are somewhat irregular pyramids of ⅞×⅝ in the base, styled, from their equality in size and weight, the "Three Brothers." Fugger notices particularly, to mark their natural excellence, that they were set open, without a foil. The four Pearls are monstrous, somewhat irregular indeed, but each half an inch in diameter. Jacob Fugger bought this, together with the Ducal cap covered with Pearls, with a band of Sapphires and Balais, and a plume-case set with Diamonds (points), with Pearls and Balais-Rubies between, for "no more than 47,000 florins." The cap terminates in a huge Balais cut into an acute pyramid, springing out of an elegant socket resting upon cherubs' heads set under the four angles of the base. All the other Balais are cut as flat pyramids. Fugger kept the pendant many years,

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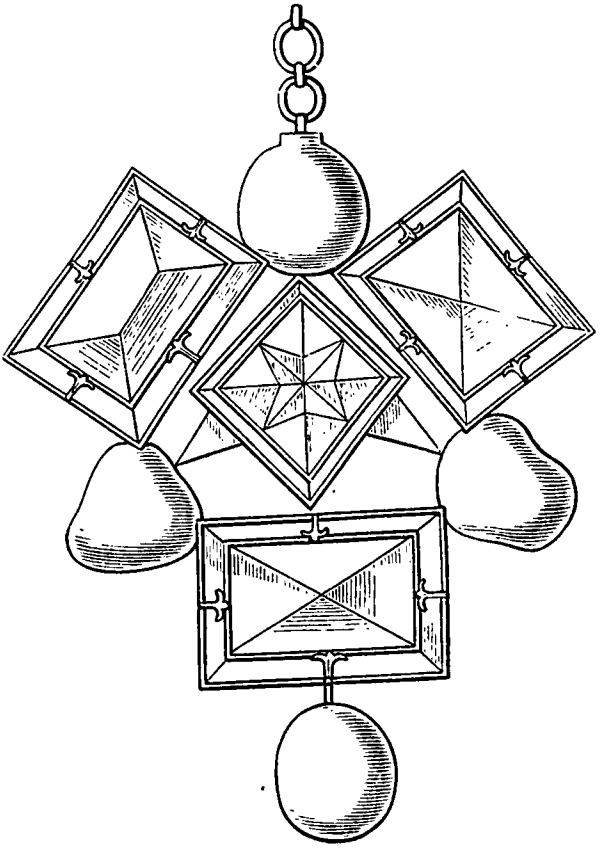
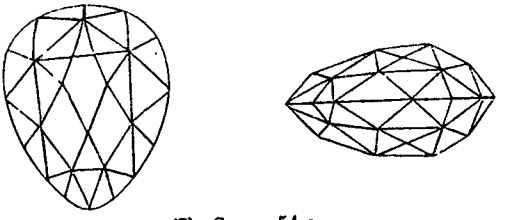
[3] Comines relates that in the plunder of Charles's tent a common soldier found his "most famous diamond, to which certain pearls were suspended;" kept the box containing it (a gold one doubtless), but threw the stone away under a waggon. However, he afterwards picked it up again, and sold it to a priest for one gold piece; the priest subsequently sold it for ten to the magistrates of his own canton. This explains how it got into the hands of the Bernese government, whence Fugger obtained it with the other jewels.



Charles the Bold's Diamond.



The Sancy, 54 c.

To face p. 38.

hoping that Charles V. would buy it as a family relic; but broke up the cap, and reset the stones in it for Maximilian II. At last his grand-nephew (the writer) sold the pendant to Henry VIII. just before his death; but adds he was honestly paid for it, notwithstanding the buyer's demise. He remarks on the singular coincidence that the jewel should thus have come gratuitously, through Mary, into the hands of the representative, in the fourth descent, of Charles the Bold, after an estrangement of seventy-six years.

SANCY DIAMOND.

The story, constantly retailed, that the Sancy Diamond was the very stone cut by L. de Berquem, as his first essay, for the Duke, is a mere fable. R. de Berquem, his descendant, who would have made the most of such a tradition had it been then current, says expressly, in his 'Merveilles des Indes' (1669), "La Royne d'Angleterre d'apresent a celuy que deffunct M. de Sancy aporta de son ambassade de Levant, qui est en forme d'amande taille a facettes des deux costés: parfaitement blanc et net; et qui pese cinquante-quatre carats."[4] Its almond-form, completely facetted over (a mode quite unknown then or at any other time in Europe), of itself, without this testimony of De Berquem, indisputably proves that it was an Indian-cut stone. Tavernier, in this very year, was remarking the fondness of the Golconda lapidaries for covering the entire surface with facets, so as to impair as little as possible the native weight of the crystal. The "Royne d'Angleterre" this year was probably the

[4] The measurement of Charles the Bold's famous stone, given by Fugger, viz. § inch square at the base, would, according to Barbot's scale, produce a weight of only 28 carats, supposing the shape a perfect brilliant. Although a few carats more must be allowed in the first case to the extremely elevated apex of the face, yet even this addition will be far from bringing up its weight to that of the Sancy. Corsi, perhaps, supplies the true source of many of the fables current as to this famous stone, in mentioning a large French diamond which went by the name of "Le Cent-six" (from its weight of 106 carats), thence easily corrupted into "Le grand Sancy." Corsi does not state the possessor's name or times. No diamond of that precise weight appears in the inventory of the regalia drawn up in 1791, in which the true Sancy is put down at 33⅛.

dowager Henrietta Maria, which explains how the Sancy subsequently appears in the possession of James II., from whom it passed to Louis XIV. for 625,000 francs (25,000*l.*).

DIAMOND-CUTTING.

Laborde ('Glossaire,' p. 250) labours hard to claim for his countrymen the invention of Diamond-cutting, and at an earlier period. It is therefore worth while to examine the strongest of the documentary evidences he there adduces to support his assertion :—

"A.D. 1407. La Courarie, ou demeurent les ouvriers de dyamans et d'autres pierres" (Description de Paris, par Guillebert de Metz). Item. (Dans une vue generale des plus habiles ouvriers de Paris) "plusieur artificieux ouvriers comme Herman qui polissent dyamans de diverses formes."

1412. "Un anel d'un dyamant gros, de quatre losanges en la face dudit dyamant, et de quatre demi-lozanges par les costez dudit dyamant; l'autre dyamant plus petit, plat, de six costez; l'autre dyamant un petit moindre, et est en façon d'un fleur de 'souviegne-vous-de-moy,' et est de quatre pieces; et l'autre dyamant est un petit moindre sur la rout" (Duc de Bourgogne, 131).

1432. "A Jehan Pentin, orfèvre et marchant de joyaux, demeurant à Bruges, pour un anel d'or esmaillé et garny d'un gros dyamant à façon d'escusson. . . . . vixx salus" (Do. 1088).

"A Hecart Duvivier, aussi marchant de joyaux, pour ung aultre anel d'or garny d'un dyamant à plusieurs faces. . . . . xvi salus" (Do. 1091).

Now it will be observed in these extracts that not a word is said of *cutting* Diamonds, but only of *polishing*[1] them—a process perhaps known from the very earliest times, and merely consisting, it may be presumed, in freeing the native crystal from the gum-like coating that in so many cases totally veils its transparency. This could very well be done by means of emery-

[1] The same idea is expressed in the Flemish name for the trade, "diamantslypers," found in a cause tried A.D. 1465, about an amethyst sold at Bruges for a balais.

powder alone, though a somewhat tedious operation. As for the "faces" quoted by Laborde as meaning *facets* cut by art, it is almost demonstrable from their arrangement specified, that they were no more than the natural faces of the crystal. The stone "in the fashion of a forget-me-not" is actually described as formed out of four—that is, four small diamonds set in the shape of that flower; and the escutcheon-shaped one may well be only a native flat stone. It may be confidently asserted that no mediæval ring, of a make earlier than 1470, can be produced, set with a Diamond that appears to have been *artificially cut* to any pattern, however simple.

As for the French origin of the art, some of his examples are but ill-chosen for his case. The name *Herman* bespeaks a Teutonic origin; and another of the jewellers is mentioned as resident at Bruges. His three *experts* too, the "diamant slypers," are all Flemings.

Laborde makes several objections to the received account of L. de Berquem's discovery. First, that De Boot, himself a Belgian, says nothing about it. But his silence in this case proves nothing, inasmuch as he never has named (it not entering into his plan the authors of many other inventions cited in the course of his treatise. Again, "that the name Berquem rarely occurs in the registers of the city of Bruges;" but if it *does* occur at all, that suffices to establish the existence of such a family there. Lastly, he makes merry at the idea of Charles losing at *Granson*, in March, 1475, a Diamond which was cut by Berquem in 1476, the year after; but this, intended for a knock-down argument, is based upon a misquotation of his own, as can easily be proved.

The story about L. de Berquem, and his accidentally discovering, by rubbing two Diamonds together, that one would bite upon the other (the true principle of Diamond-cutting), rests solely upon the authority of Robert de Berquem, calling himself his descendant, who, two centuries after his epoch, in the year 1669, being established in Paris in the same line, as goldsmith and jeweller, published a treatise on precious stones, entitled 'Les Merveilles des Indes Orientales.' Let us see what he really does say:—"Au même temps Charles, dernier duc de Bourgogne, à qui on avait fait récit [of this discovery] lui mit trois gros dia-

mans entre les mains; à les tailler advantageusement, selon son addresse. Il les tailla des aussitôt; l'un espais, l'autre foible, et le troisième en triangle:[2] et il réussit si bien que le duc, ravy d'une invention si surprenante, luy donna trois mille ducats de récompense. Puis ce Prince, comme il les trouvoit tout à fait beaux et rares, fit présent de celui qui étoit foible au pape Sixte quatriesme: et de celuy en forme d'un triangle et d'un cœur, réduit dans un anneau et tenu de deux mains, symbole de foy, au roy Louis XI., duquel il recherchoit alors la bonne intelligence. Et quant au troisième, qui étoit la pierre espaisse, il le garda pour soy, et le porta toujours au doigt, en sorte que il l'y avoit encores quand il fut tué devant Nancy, un an après qu'il les eut fait tailler: sçavoir, est en l'année mil quatre cens soixante dix-sept."

It will be remarked here that R. de Berquem makes Charles lose the Diamond with his *life* at Nancy, not with his *baggage* at Granson, two years before; and thus the anachronism that Laborde ridicules does not in reality exist. But after reading the accounts above cited from Charles's contemporaries, Commines and J. J. Fugger, it is clear that the Duke's "famous and fabled Diamond" was only one, and *that one* was lost at *Granson*. Robert, writing at that distance of time, and, like everybody else then, knowing nothing of mediæval fashions, naturally enough makes Charles wear his splendid Diamond in a ring, as everybody was doing in 1669, not in a pendent jewel, an ornament so long obsolete; and equally naturally represents him as keeping to his death this last relic of his fortunes. All these inaccuracies are such as creep into family traditions, without invalidating the main facts of the story. But if Louis did in truth cut the stone in that novel and skilful pattern engraved by Fugger, and received that munificent reward for his invention, it must have been before the disaster of Granson, after which date the Duke had neither money nor inclination for such articles of luxury. The capricious form recorded to have been given to the third stone, the "triangle and heart" combined, has a striking analogy with the ingenuity displayed in the devising of the figuration of the first. As yet the inventor had no idea of improving

[2] The rough stones were, one deep, the second thin, the third triangular.

the lustre of the Diamond: his object was to display his victory over the invincible material.[3]

Barbot (*Taille du Diamant*) considers it an absurdity to suppose that the action of one Diamond upon another could have been discovered by accident, so much force being actually required to make one bite on the other. This is true for the *effective* operation, but the idea of their possessing such power may very possibly have been suggested by observing the effect of slight and casual friction. Like a true Gaul, Barbot solves the difficulty by making Berquem go to Paris to study the art under Herman.

Laborde, to prove the antiquity of the art of *diamond-cutting*, adduces the use of the diamond-point by the ancients for engraving gems.[4] This is totally foreign to the purpose: nothing could have been done in the way of reducing the Diamond to any given shape until the secret was discovered how to get the *diamond-dust* to replace the emery, that agent only effectual for the softer gems; and this diamond-dust could only then be obtained by rubbing one stone against the other; there was as yet no supply of small Diamonds only useful for pulverisation. This then was the grand discovery of L. de Berquem; and until a genuine piece of mediæval jewelry be produced, containing a Diamond actually cut to a definite pattern, there is no reason why he should be robbed of the honour he has so long enjoyed.

In the modern art the first principles are the same. The stone, if of a very irregular formation, is brought towards its required shape by cleavage. A nick being scratched with a diamond-point along the direction of its laminæ, a smart blow with the knife severs the projection, which can subsequently be itself cut into a shapely stone of appreciable dimensions and value.[5] The

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[3] It was not before the *rose*-pattern was invented that the *brilliancy* of the diamond was much augmented by the cutting. For *that*, the old jewellers depended upon the *tinctura*. The table-cut stone of De Boot's times merely gained regularity of form and polish from the *cutting*.

[4] Whether the ancient "punctum adamantis" was a splinter of corundum (which is the most probable) or of the true diamond, it was always set in an iron handle for use; a different thing altogether from using the dust applied to the wheel in lieu of the *smiris*.

[5] Receiving 6, 8, or 12 facets, according to their extent, they come

next process is the rough-sketching of the required form, appropriately termed in French *brutage*. Two diamonds of nearly equal size are cemented each in a handle, and rubbed one against the other until one facet of equal extent is mutually ground out of the surface of each. The powder as it falls is received in a box, and becomes the essential agent in the next operation. This is the polishing, performed upon a disk of soft iron about a foot in diameter, made to revolve most rapidly (thirty times in a second) in a horizontal plane, and having its surface covered with the diamond-dust[6] mixed with the finest olive-oil. The diamond is embedded in soft solder in a socket at the end of an iron arm, leaving but so much of its surface exposed as is required to be acted upon. By placing weights on the extremity of this arm (that touching the wheel), it will be seen that the necessary degree of pressure is obtained for keeping the stone tight against the revolving disk below. In this way several diamonds are operated upon at one time, the workman repeatedly examining each; and when a facet is completed he extracts the stone, and rebeds it in the solder so as to present another portion to the action of the cutting surface. All this is done entirely by the eye; for it is by constant practice that the secret is learnt of cutting the numerous facets with such invariable exactness. In former times the wheel was put in motion by a treadle worked by the foot, and each man worked at home: at present the master supplies the steam-power, and numerous wheels are set going in one large room. At present this business is confined to the city of Amsterdam: it is entirely carried on by Jews, and the number of them engaged in it there is about ten thousand.

The *rose*, brought to a more or less convex form, has the surface cut into twenty-four little facets, while the base is polished and remains a plane. This, with the *table*, were the only patterns known during the seventeenth century, and the first quarter of the next. Even in jewels of the reign of Queen Anne they

into the market as *Antwerp roses*. The true rose has 24 facets, and is known as the *Dutch*.

[6] For the rougher part of this operation they now largely use the Brazilian Carbonado, formerly called the black diamond, and the rarest of the species, but of late years found in abundance and in large masses.

alone appear, as for instance in certain jewels made by her order for the Duke of Marlborough, as I have been informed on the best authority. It is the opinion of the same most competent judge that the latest and most perfect of all—the *brilliant* pattern —was invented some time in the reign of George I. In this the Diamond is made to assume the form of two cones united by their bases; the upper cone so much truncated as to present to the eye a considerable plane surface; the lower but slightly so, terminating almost in a point. Thus the stone, being set with the broader plane upmost, possesses great relative depth, which, strengthening its refractive power, aided also by the numerous facets that cover the sides, both combined mightily augment the brilliancy of the Diamond (whence the name) by confining the rays of light inside it.

In the technical description of the *brilliant* ("brillant récoupé"), the upper surface is the *table;* the junction of the upper truncated pyramid with the lower, or the broadest part, the *girdle;* the lower pointed portion, the *collet* ("culasse"). Between the table and the girdle are 32 facets; below the girdle 24. Facets are named from their forms, "dentelles, losanges, feuillets." As a rule, small stones lose 38 or 40 per cent. of their weight, large ones 50 and even more, in being reduced to this form; but in the old perfect Indian octahedrons the loss was much less, the crystal naturally lending itself to the shape.

At that period the chief seat of the business of diamond-cutting for the world was London; and even now an old town-cut brilliant can immediately be distinguished from those prepared by the modern Dutch (who sacrifice beauty of form to preservation of weight), by the superior accuracy and excellence of the work, and consequently it commands a far higher price in the market; for the lustre of a brilliant depends in great measure upon the judicious distribution and accurate finish of the facets composing its sides.

De Boot, who, assisting his imperial master,[7] worked long and

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[7] Who had himself discovered the secret of clearing bad-coloured stones "aqua spagiritica" and by heat, thus anticipating Barbot, who makes the same boast.

sedulously at this art, has left many curious details of the process as carried on in his times. He gives a figure of an ingenious contrivance invented by himself for cutting several stones at once. It may be briefly described as a horizontal, circular frame, perforated with holes, which received as many handles, on whose ends the diamonds were cemented.[8] These handles, by weights applied above, kept the stones in close contact with the wheel revolving below horizontally, which was a mere rim of pewter equal in circumference (three feet) to the frame above, and provided with a border to keep the diamond-dust and oil with which it was moistened from falling off. As may be supposed, from want of motive power, the operation was very slow: he mentions that it was only necessary to unbed each stone once a week. But it must be borne in mind no cutting of facets was as yet attempted: the wheel had only to attack the large and simple planes of tables and of pyramids. He knows nothing of the *brutage* or preliminary shaping of the stone, but states that this pewter wheel was employed for cutting down the diamond as well as for polishing it. The diamond-powder was then obtained by breaking up inferior stones with a large hammer: its value was ten thalers per scruple. He also notes that a perfect table-diamond then sold for fifty ducats, and he supplies a table constructed after a somewhat complicated theory for ascertaining the value in proportion to the weight; but the result approximates pretty nearly to the modern, viz., to square the number of carats, and multiply the sum by the selling price of a stone of one carat. For example, supposing the latter to be 8*l.* (as it is at present), the value of one of 5 carats[9] would be $5 \times 5 = 25$, which multiplied by 8 gives 200*l.* (Barbot states the selling price of a perfect

[8] The cement then used was made of turpentine, pounded brick, and hard pitch.

[9] Few of my readers know the origin of the word *carat*. It comes from κεράτιον, a kind of vetch, the seeds of which, running very uniform, furnished natural weights for estimating the value of small and precious articles to the Orientals; just as barley-grains afforded the unit of weight and of measure to the Europeans. A carat weighs 4 grains French, or $3\frac{3}{4}$ Troy. Carat, moreover, is used in another sense in speaking of the precious metals; standing for an imaginary division of the pound Troy into 24 parts; and the standard is expressed by naming how many of those parts the pure metal forms, the remainder being

brilliant one carat weight in Paris (1858) as 300 to 320 fcs.) The grand test with the jewellers of those times for distinguishing the real Diamond from the spurious, of which so many were then current, as the White Sapphire, the Citrine Beryl, and the Crystal cut into a pyramid, was to ascertain whether it would "take the tincture." This was a varnish made of ivory black and mastich applied to the back of the stone, which, if a true Diamond, obtained vast brilliancy from this background; but if any other gem, became dull and lustreless. Some used the oil exuding from a roasted grain of wheat, others backed the stone with a bit of black silk. To set the Diamond transparent was never thought of before our times.

The White Topaz of Brazil is now the only stone which has any chance of being passed off for the Diamond. It is in truth extremely hard, and very brilliant, but wants the adamantine lustre and the iridescence.

It is a singular proof of the force of long-established fable to find the practical De Boot, though conjecturing, from its analogy to amber in the property of attraction, that the Diamond is "igneæ et sulfureæ naturæ," yet goes on asserting that it is not only proof against fire, but even improved by exposure to its action for several days. Exactly a century later, Newton conjectured it to be combustible, because its refractive power, which is to that of water as 1·0396 to ·785, so greatly exceeds that due to its density.[1] Soon after this Averani burnt a Diamond in the presence of Cosimo III. at Florence; but even then no one thought of performing the operation in the ordinary way: it must needs be effected by the solar rays concentrated with a burning-glass. At last some one trying the experiment in a smith's forge found the stone converted into charcoal at the melting point of silver

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understood as the alloy. Thus the standard of the sovereign is 22, or two parts alloy; of watch-cases, Hall-marked, 18, or six alloy, *i. e.* one quarter of the mass. The latter is the lowest standard permitted by law in France, where certainly "they order these matters better" than with us.

[1] For the same reason Brewster supposed it to be nothing more than a fossil-gum; and his theory is strongly supported by the existence in such vast quantities of the *carbonado* or amorphous black diamond, which bears the same relation to the pure species as jet does to amber.

only. And in the year 1800 Clausel, Weller, and Hachette, by adding one part of Diamond to sixty of iron, obtained an ingot of excellent steel.

Hardness is very important as a practical test for ascertaining the species of gems, on account of its easy application. It means that the native crystal of any species will scratch all in the scales below it. Thus the Diamond, standing highest (10), scratches all the rest. 9. Corundum; Sapphire, Ruby. 8. Brazilian Topaz. 7. Rock crystal. 6. Adularia, or Moonstone. 5. Asparagus-stone. 4. Fluor spar, &c.

For all the details connected with the present trade in Diamonds, both wholesale and retail, the reader desirous of complete and accurate information can have no better authority than Barbot "ancien joaillier," under "Diamant," in his 'Traité Complet des Pierres Précieuses,' Paris, 1858. But the historical portion is full of inaccuracies here, as in the rest of his treatise. The artistic part is even more defective: it is only valuable where he strictly confines himself to his *métier*.

AETITES. *Eagle-Stone.*

THE lively fancy of the Greeks discovered in the forms of natural objects resemblances to other organic forms, and, by a step not very logical, ascribed to them inherent virtues analogous to this interpretation. Of this system the *Aetites* is perhaps the most illustrative example, and the one also that the longest maintained its ancient reputation. Pliny describes four species of it (xxxvi. 21). The first was egg-shaped, white, and filled with a soft sweet-tasted clay: this was the female. The second, reddish-coloured externally, contained a stony substance, and passed for the male. The third was filled with a sweetish sand. The fourth, the Laconian, had inside it a crystalline core, called the *Callimus*. The best kind were asserted to be only found in the nests of eagles, which could not breed without their aid; hence their name. They, for this reason, were of the greatest benefit to women in labour; a notion which even Dioscorides appears to endorse. The substance itself, as the specimens figured by De Boot plainly show, was one of those calcareous hollow concretions, sometimes white, sometimes tinged with iron, well known to geologists; and which appear to be accidental formations, not petrifactions of older organised bodies.

The Aetites must not, however, be confounded with another stone named in a fragment of Theophrastus ἡ λίθος τῶν τικτούσων, "the *gem* of parturient women;" to which he also alludes (in section 5) by, "The most wonderful and most important property is that of the stones that bring forth others." This was the *Pœonites*, described by Pliny under that name, as reported to conceive at a certain time and bring forth another; therefore very serviceable to women in labour; found in Macedonia, and in

appearance like water frozen. It was therefore a *gem*, as the feminine gender in the Greek denotes, not a mere rough *stone* like the Aetites. Marbodus says of it—

> "The mountains of the Macedonian bold
> Within their mines the Pæonites hold;
> Unknown the cause, with imitative throes
> It heaves, and all the pangs of childbirth knows.
> Hence pregnant women its protection bless
> In that last hour when travail's throes oppress."

Of the Aetites another most singular property is alluded to by Dioscorides,—that of detecting theft. His meaning is explained by the traditional practice of the Greek monks, described by De Boot from his own experience. All the persons suspected of the theft being called together, the monk kneads up in their presence flour and water, sprinkled with the powder of this stone, repeating at the same time a certain incantation, and, moulding the paste into balls as big as eggs, gives three to each, with a little drink. The guilty party finds it impossible to swallow one mouthful, or is ready to choke in the attempt. By an odd coincidence the Hindoos still employ a similar ordeal, but substitute dry rice for the paste. No doubt, where all are believers, the mere effect of the guilty conscience on the nerves will suffice to hinder the culprit from getting down the enchanted morsel; but De Boot affects a pious horror at the whole proceeding, and ascribes its efficacy to diabolical agency.

He ascribes all its medicinal virtues to its natural attractive power; hence its effect as an antidote against poison, which it consequently extracted from the system. On this too depended its more special use; for, if tied round the female's arm, it kept up the fœtus until maturity, but, if transferred to her thigh, it attracted it downwards, and thus ensured a speedy delivery. Such was its established reputation for this object, that, at the time he wrote, ladies used to pay from ten to twenty thalers for a *genuine* one.

ALABANDICUS: *Almandine: Precious Garnet.*

"GARNET" Lessing conjectures to be an Italian corruption of "Garamanticus," an inferior kind of the Carbunculus according to Pliny's classification; but it is much more probable that the common gem has borrowed its present name (Anglicized from Grénat; Granato) from the *Granatici* specified by Marbodus as early as the 11th century: the Red Hyacinths of the Romans, so called from the resemblance of their colour to the crimson juice of the pomegranate. For stones of the same colour were promiscuously classed under one head by the ignorance of the Middle Ages (unacquainted with even the ancient test of comparative hardness), whence has arisen that strange interchange of names between ancient and modern precious stones so perplexing to every mineralogist. But in this case the confusion is the more excusable, seeing that every variety of the Red Hyacinth (Ruby) has an exact counterpart in colour amongst the various kinds of Garnets, and in many cases they can only be distinguished from each other by hardness, specific gravity, original crystallization, and other properties not obvious to the eye, till lately the sole criterion. The Father of Mineralogy, Theophrastus, evidently is describing several very different stones under the head of Ἄνθραξ (18); for although his first kind, "brought from Carthage and Massilia, blood-red, but like a live coal when held against the sun, and of extreme value, so that a very small one sold for 40 gold staters (40 guineas)," seems to have been the true Ruby, yet that found near Miletus in "polygonal pieces" must have been our Garnet, the primary form of which is the rhombic tetrahedron. Similarly those named by him as found in various parts of Greece, and as

being of little value (33), and which he distinguishes from the precious Ἄνθραξ by giving them the lowering name Ἀνθράκιον, must have been the Common Garnet. These were, that found at Orchomenus, darker than the Chian sort, and out of which mirrors were made; the Trœzenian, red clouded with white; and the Corinthian, still fainter in colour. The plane surface of a dark Garnet will reflect objects with considerable distinctness; the "mirrors" here mentioned were probably "table" Garnets of this kind: (the only gems employed in the Merovingian jewels of the 7th and 8th centuries are in fact Garnet tables neatly inlaid to form patterns in their fibulæ of copper gilt).—Theophrastus thereupon remarks that the better sort were rare, and brought but from few places—Carthage, Massilia, Egypt, and Syene. Pliny divides his Carbunculi into male and female, the former of a brilliant, the latter of a duller lustre. In the males of the Carthaginian kind, as it were a blazing star shone within them, whereas the females diffused their entire lustre externally. These Carthaginian stones were smaller than those from India. It may be deduced from these characters that the male Carbunculi were our Rubies, the females our Garnets.

The precious varieties, according to Pliny, were the Indian, the Garamantic or Carthaginian, the Ethiopic, and the Alabandine. The last were so called because, though found in the Orthorian rocks, they were worked up (perficiuntur) at Alabandæ. This was the sort called by Theophrastus the Milesian, both places being in the same province, Caria. The Alamandine of the moderns is the finest species of Garnet, of a beautiful crimson tinged with violet, and is brought from Suriam in Pegu, hence they are vulgarly called *Syrian* Garnets. These were the Amethystizontes of Pliny, then as now considered the best of the whole species, though it is probable he included the *Spinel* under the same designation. He notices how some amongst the males possessed a more liquid, others a darker fire; how some were lighted up with a colour not their own, and shone more than others in the sunlight. The description he quotes from Archelaus of the Carthaginian sort exactly applies to our best Indian stones, "that it was of a darkish aspect, but

kindled up more brightly than the others when held and turned about in the light of the fire or sun. In the shade within doors the colour was purple; in the open air flamy; that the wax sealed with such a gem would melt even though in the cool."

These descriptions of the several varieties of the ancient Carbunculus will be rendered more intelligible by a brief account of the various Garnets known to the modern lapidary. First in value comes a rare stone, the *Guarnaccino* of the Italians (from Vernaccia, red wine), of a vinous yellow, seeming to hold the mean between the Jacinth and the Garnet, since it unites the distinctive marks of both, combining the orange of the one with the wine-colour of the other. It is a splendid stone, of great lustre, and, when of the first quality, can with difficulty be distinguished from the browner tinted Spinel. Fine Roman intagli frequently, and sometimes imperial portraits, occur in this admirable material.[1] The *Common Garnet* is precisely of the colour of Burgundy wine, more or less diluted according to its goodness. The *Pyrope* differs slightly from this chemically (magnesia replacing in it the peroxide of iron), but not in appearance, except in being clearer and brighter. The *Carbuncle* is somewhat darker than the last; and is, in fact, the common Garnet cut "en cabochon," or into a very convex form on the upper surface, whilst the base is hollowed out more or less to give translucency to the stone; for in their native state they are so dark in tint as to be nearly black until held against the light, when the red becomes visible. Many antique Carbuncles are found with the back hollowed out, precisely in the modern manner; but, if the quality of the stone allowed it, the ancients preferred cutting the bottom of the gem to a plane surface, instead of increasing the risk of fracture to so brittle a material by diminishing its substance. The *Vermilion Garnet*, or *Vermeille*, is of a bright red, with a considerable mixture of yellow, retaining nothing of the vinous tint of its class, and differing but slightly from the *Guarnaccino*.

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[1] A still rarer variety, but also known to the ancients, is of a pale rose-colour, much resembling the Balais, now exactly imitated by the burnt Brazilian Topaz.

Garnets seem to have been little employed by the Greeks for engraving upon, but were largely in favour with the Romans of the Empire, though not at a very early date, as may be concluded from the frequent occurrence of splendid stones completely disfigured by the wretched abortions in the way of intagli cut upon them, evidently the productions of the very decrepitude of the art. Nevertheless, many tolerable, and a few excellent intagli *do* occur on Garnet, but for the most part on the Almandine, a testimony to the superior estimation in which that variety has ever been held. That very intaglio to which, as Köhler justly observes, neither ancient nor modern art has ever produced an equal as regards the skill and industry displayed in the execution, the "Head of the Dog Sirius" in the Marlborough Collection, is engraved in a perfect Indian Garnet of unusual size and beauty. The impression from this intaglio presents the head in full relief, with open jaws, the interior of the mouth represented with miraculous fidelity; and its value still further enhanced by the legend on the collar, ΓΑΙΟΣ ΕΠΟΙΕΙ. The antiquity of this work has been disputed, without much cause: certain it is that the artist Natter, to whom it has been assigned, was far from capable of producing such a masterpiece. Another smaller replica of the same head on an Almandine is known: the hot and fiery nature of the stone was doubtless regarded as analogous to the subject upon it, the blazing Dog Star. Another famous Almandine is that of the same cabinet, engraved in the highest style of Roman art with the heads of Socrates and Plato; a gem which above all others has served to identify the portraits of the latter philosopher. A few other fine heads in this stone might be quoted, but such are of excessive rarity, and all belong to Imperial times.

Heads of the Sassanian kings frequently appear upon this gem; in fact, it would seem to have been regarded by the later Persians as a royal stone, from the preference they have given it as the bearer of the sovereign's image and superscription.

Callistratus states that some of the Indian Carbunculi attained such extraordinary dimensions as to admit of being formed into cups holding a sextarius, or nearly a pint. Such stones, according to Satyrus, were never clear, but generally foul within,

and of a harsh, disagreeable tint. Such a description applies to our commoner Carbuncle, which does indeed attain a very great bulk, though the fact mentioned by Callistratus is tinged by the usual exaggeration of the Grecian traveller in the far East. Yet I have seen an antique cup, hollowed out of a solid Garnet, as large as a half goose-egg, and which was engraved internally with the name of its ancient owner, Codrus;[2] and a tablet (Herz Collection), covered with a long Gnostic formula on both sides, an Alexandrian work of the 3rd century, is 2½ × 1½ inches in extent, showing the immense magnitude of the crystal from which it had been sawn. In these two works the material was of bad quality, confirming Pliny's quotation from Archelaus (30), that "those found near Thebes were brittle, full of veins, and like burning coals nearly expiring."

Pliny concludes his long dissertation (of six chapters) upon the Carbunculus with the observation that all the varieties of this stone obstinately resist the engraver, and the wax adheres to them in sealing. This is quite correct as regards the soft sealing material used by the ancients, a composition like our modelling wax, made of bee's-wax, rendered plastic by the addition of a few drops of turpentine to the melted mass, and a little vermilion to colour it. They also used for sealing a fine pipe-clay, called "creta," which still continues the Italian term for the clay used in modelling.

Although the great artists of the Renaissance have left us some magnificent works in this stone, both in relief and intaglio, yet modern artists have seldom employed it, except for the small cameo portraits intended to pass, when foiled, for works in Ruby. The stone is extremely hard to work, and, besides this, very brittle, difficulties that they cannot overcome; a thing which bears so much the stronger testimony to the skill of the ancient artists, who have left such highly finished works in so refractory a material.

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[2] Barbot (Pierres Précieuses, 357) quotes from the inventory of the French Crown Jewels in 1791: "An oval cup of a single garnet, rich in colour, 3 × 2½ inches wide, and 3 high; and a round cup of oriental garnet, full of flaws, 3 inches wide by 1½ deep," besides six others of less size.

Our Garnets and Carbuncles, aluminous silicates coloured by iron oxide, are now supplied in vast quantities from the mines of Zöblitz in Silesia, from the Tyrol, and from Hungary. These are all inferior, both in beauty and hardness, to those from Siam, which sends stones of the richest red, tinged with yellow, besides its peculiar purple-tinted Almandines. The latter also come in abundance from Ceylon; hence their popular name of Ceylon-rubies, by means of which our jewellers obtain a better price for them from the ignorant. In spite of this abundance, even now a stone of a certain size, of a fine rich tint, and free from flaws, is of considerable value, ranging from 8*l.* to 10*l.* But its estimation has greatly fallen since the days of Mary Queen of Scots, the pendent carbuncle to her necklace worn at her marriage with the Dauphin being worth 500 crowns—an enormous sum in that age. Thus De Boot, about the year 1600, states (II. 36) that small Bohemian Garnets, up to the bigness of a pea, were found abundantly in the fields around Prague, but that one the size of a hazel-nut would equal a Ruby in value. This kind he prefers to the Indian. The latter he estimates at 2 thalers per carat up to 20 carats; then at 3 up to 40; at 4 up to 60; and at 5 up to 100. But in De Laet's time, fifty years later, they were all of little value.

ALABASTRITES.

THIS is the stone now known as the Oriental Alabaster (Carbonate of Lime), as appears from Pliny's description (xxxvi. 12) of the best sort, the Carmanian, "of a honey-colour, variegated with spiral spots (vortices) and not transparent; for the colour of horn, or fatty white, or anything resembling glass in it, were considered blemishes." To this the name of *Onyx* was originally given from the resemblance of its layers and tints to the shades in the finger-nail of a "well-bred person," to quote Epiphanius. This last writer mentions an opinion of some, that its formation was due to the dropping of water: in which they were altogether in the right, for it is identical in constitution with Stalagmite. But this same ignorant transcriber concludes his article on the Onyx with a hopeless confusion between the *marble* and the *gem* of the same name. To avoid such ambiguity, the Romans restricted the term Onyx to the gem so called at present, one kind of which, the Agate-Onyx (made up of layers of opaque and transparent white), exactly resembles the regularly stratified varieties of this marble, the Albâtre-Onyx of the French. The latter stone now became the *Alabastrites*, from its being chiefly employed as the best material for the Alabastra, or perfume jars, shaped like minute amphoræ, but "without handles," as their Greek appellation signifies. Such alabastra were made in all materials—pottery, glass, the precious metals; but this stone was above all the most in use. Hence St. Mark's *ἀλάβαστρον μύρου νάρδου πιστικῆς*, and Horace's "Nardi parvus Onyx," meant one and the same thing, the latter retaining the ancient designation of the substance. The slender necks of these jars were readily broken off to come at their contents (perfumed oils), having been closely sealed down by the maker on leaving his laboratory. That their reputation for pre-

serving the perfume unchanged for a great length of time was perfectly deserved, a convincing testimony is offered by certain large alabastra from Pompeii (now in the Museo Borbonico) still diffusing a strong odour of their ancient contents: whereat the Emperor Nicholas on his visit "rimase sorpreso," as the custode tells you; and not without reason. The inferior sort chiefly used for this purpose was quarried, says Pliny, near Thebes in Egypt, and Damascus. Vast numbers of Canopi, or sacred jars, of a squat form, with the head of a mummy for a lid, still exist in this Egyptian stone, which is identical in quality with the Derbyshire Alabaster so much worked up now into cheap ornaments.

This common Alabaster certainly deserves the name of "Finger-nail stone" better than the more precious substance that has usurped its original title, for it often exhibits layers, slightly curved, of flesh colour and opaque white arranged like the shades in the human original. The Greeks however made a subtle distinction in the appellations of the two species, not observed by the Latin mineralogists; giving the name of Ὀνύχιον to the gem, and of Ὀνυχίτης to the marble. Ὀνυχιτὶς λίθος, in the feminine, to distinguish its precious quality, is used by Appian for the gem, in speaking of the treasures of Mithridates.

The Oriental Alabaster, when first imported into Rome, was considered a highly valuable material, and to be produced in Arabia alone. Brought over in such small pieces as only to be worked up into cups and the feet of couches and chairs (the lion's-paws so often seen serving in that capacity), some amphoræ, as large as the Chian wine-vessels, exhibited by P. Lentulus Spinther, were regarded, says Corn. Nepos, as wonderful curiosities.[1] Yet, five years later, so greatly had the importation of it increased, he had seen himself columns 32 feet long of that very marble. Four small columns were placed by Balbus in his theatre as an unprecedented ornament; this was under Augustus, whereas Pliny's contemporaries had admired thirty such of larger size in the banqueting-hall built by Callistus, the most powerful of the freedmen of the Emperor Claudius. Superb examples of such

[1] A most elegant example of these may be seen in the Temple Room (Brit. Mus.), and also a cinerary urn in the same beautiful substance.

magnificence are yet preserved in some of the older Roman churches, relics of the times alluded to by Pliny; but none have ever approached to the magnitude of those presented by Mohammed Ali to the new fabric of S. Paolo fuori le Mura, columns and pilasters, 40 feet long, each of a single block and the most beautiful quality. Under this Pacha the ancient Egyptian quarries had been re-opened, and furnished the material of which his sumptuous mausoleum at Cairo is exclusively constructed: a piece of magnificence beyond the ambition of even Nero.[2]

It is singular that Pliny should have noticed no other quarries of this marble than those in Asia and Egypt, for the mountain on which Volterra is built yields large blocks of a variety richer in point of colour than the Oriental, a warm brown variegated with lemon: this had been much in use with the Etruscans, as their sepulchral monuments remain to attest. The magnificent and huge vases, now exported from Tuscany, belong to the Volterran fabrique. It is indeed true that the Volterra stone differs chemically from the Oriental, being a Sulphate of Lime or Compact Gypsum; but such a distinction would have had no significance in ancient mineralogy. Thus the *Lygdinus* subsequently mentioned as dug up in Paros, but in small slabs, never exceeding the measure required for a dish or a bowl, and equal to the Egyptian stone as a preservative of perfumes, was apparently Compact Gypsum, from its distinctive character adduced of superlative whiteness, "candoris eximii." The fact that some of the sorts were burnt to lime and used in plasters (as depilatories ?) also indicates that the Onyx-marble included both the Carbonate and the Sulphate of Lime.

The French clearly distinguish the two species, confounded under the common name *Alabaster* in English, designating the hard Carbonate of Lime Albâtre-Oriental when dappled, and Albâtre-Onyx when regularly stratified: the softer Sulphate of Lime on the contrary (the common European kind) is their Albâtre-gypseux, or Alabastrite.

[2] Nero actually built the temple of Fortuna Scia enclosed within the precincts of his "Golden House" out of a translucent marble, the Phengites, then just discovered in Carmania. This edifice when shut up was perfectly light within. In certain very ancient Italian churches (as S. Miniato) the windows are filled with single slabs of a translucent stone, which is not Talc, and probably preserve an example of this Phengites.

AMETHYSTUS: Ἀμέθυσος; Ἀμέθυστος: *Amethyst.*

The Common Amethyst, and the stone generally designated amongst the ancients by this name, is nothing more than rock crystal coloured purple by manganese and iron, and hence is more properly termed in modern mineralogy Amethystine Quartz. It is therefore of an entirely distinct species from the true Oriental Amethyst, a most rare and valuable species of the Precious Corundum, being in fact a purple Sapphire, where the purple shows little of the red seen in the common Amethyst, but is rather an extremely deep shade of violet. The name of "Oriental" is however improperly applied by the English lapidaries to the Amethyst Quartz when very brilliant and of two shades of colour, the true gem of the name, from its rarity, being known to but a few among them.

The name "Amethyst," though most probably a mere corruption of the Eastern name for the stone, a trace of which seems preserved in the Hebrew Achlamath,[1] was by the fanciful Greeks interpreted as though formed from their own language, from *a* and *μεθυ* "wineless," and thereupon the gem was invested by them with the virtue of acting as an antidote to the effects of wine.[2] Hence the point of several epigrams in the Anthology, as that of Antipater (or Asclepiades) on the signet of Cleopatra, an Amethyst engraved with a figure of Μέθη, the genius of intoxication (ix. 752),[3] and another (ix. 748).

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[1] Perhaps the true origin is the Persian "Shemest."

[2] Mohammed Ben Mansur affirms that wine drunk out of an amethyst cup does not intoxicate.

[3] Ειμι Μεθη, το δε γλυμμα σοφης
χερος εν δ' αμεθυστῳ
γεγλυμμαι· τεχνης, δ' η λιθος
αλλοτριη·
αλλα Κλεοπατρας ιερον κτεαρ· εν
γαρ ανασσης
χειρι θεον νηφειν και μεθυουσαν
εδει.

"A Mœnad wild, on amethyst I stand,
The engraving truly of a skilful hand;
A subject foreign to the sober stone,
But Cleopatra claims it for her own;
And hallow'd by her touch, the nymph so free
Must quit her drunken mood, and sober be."

Ἄ λίθος ἐστ' ἀμέθυστος ἐγὼ δ' ὁ πότας Διόνυσος,
ἢ νήφειν πείσει μ', ἢ μαθέτω μεθύειν.[4]

Or, as Pliny explains it (xxxvii. 40), "because they never come up to the colour of wine, since before they touch it their lustre falls off into the colour of the *viola*" (*i.e.* pink cyclamen).

Pliny divides them into five kinds, the Indian holding the first rank; others came from Arabia Petræa, Armenia Minor, Egypt, and Galatia; inferior sorts from Thasos and Cyprus. The Indian displayed the precise colour of the imperial purple; a variety of these "degenerated into that of the Hyacinthus (Sapphire), and was called by the Indians Sacondion, Sacon being their term for that particular tint; if still lighter, it took the name of Sapenos." The fourth sort was of a wine colour; the fifth and worst was so pale as to resemble a crystal. The most admired tint was when a slightly rosy hue shone out from amidst the purple, and became more conspicuous when viewed by transmitted light (in suspectu); such were distinguished by the title of Pæderotes (Cupids), or the "Gem of Venus," on account of the pre-eminence of their kind and their beauty.

The deeper the tint the less brilliant is the stone, for which reason the ancient engravers preferred the light-coloured variety, which of all gems, next to the Jacinth, possesses the greatest lustre; or they may have used it for cutting upon on account of its greater cheapness, remarked above. That Amethysts of a fine colour (now so worthless) were deemed too valuable by the ancients to have their surface diminished by the sinking of intagli into them, appears from examples now extant. They were either worn as mere ornamental jewels uncut, or else polished to an extremely convex form, presenting in their exact centre a diminutive intaglio, a Gorgoneion, or a mask, in the nature of a talisman, that augmented the supposed virtue without detracting much from the native beauty of the gem. Pliny notes the suitableness of all the Amethyst family for engraving upon (scalp-

[4] On wineless gem, I, toper Bacchus, reign;
Learn, stone, to drink, or teach me to abstain.

turis faciles), a sufficient proof that no species of this stone was the Hyacinthus (the common explanation of archæologists from De Boot to K. O. Müller), which Solinus with justice calls the hardest of all gems, and only to be touched by the Diamond-point.

Intagli of all dates and in every style occur upon Amethysts, but so much more generally on the pale sort that an engraving upon one of a rich dark colour may, on that very ground, be suspected as modern. Besides the foregoing remarks as to the high value of such a stone in antiquity, the modern artists have usually employed the Hungarian Amethyst as being now the most abundant, of which the tint is extremely deep, though the lustre is far below that of the Indian. Amongst the few exceptions to this rule that have come under my own notice is a head of Mithridates, perhaps the grandest Greek portrait in existence, cut in a large Amethyst of the deepest violet colour, found a century ago in India, which, however, being doubtless the royal signet, rather corroborates than weakens the previous statement. For such a use the most precious material procurable would naturally have been selected; "ut alibi ars, alibi materia esset in pretio," to use Pliny's expression. Another fine Greek intaglio, a head of Pan, in front face, on a similar stone, was in the Uzielli Cabinet, the antiquity of which could not be called in question; and, above all, the unrivalled Marlborough Omphale, the first amongst all the numerous repetitions of that favourite subject, where the Amethyst (of the Indian kind) possesses equal lustre and richness of colour.

Small heads, and even busts, both in full and in half-relief, often occur of antique workmanship in this stone: as some perfectly preserved remains show they served to complete statuettes in the precious metals. Although the Amethyst came into use amongst the earliest materials used by the gem-engraver, for we find in it an abundance of Egyptian charms (pendants for necklaces), in the form of vases, shells, hands, &c., and sometimes scarabæi, the last of Etruscan work also, and Roman intagli in it are sufficiently abundant, yet it is a singular fact that we rarely meet with works in the highest style of art of any period executed in this material. Probably the superior kind was too

precious to be so employed, whilst the paleness of the other and cheaper sorts was repugnant to the taste of first-rate artists.

But besides the stone known at present by the same name, there can be little doubt the Roman "Amethystus" included amongst some of its varieties a totally distinct species of gem, some kinds of our common garnets. This conjecture is supported by the authority of De Boot, who, writing in the early part of the 17th century, says (ii. 30), "Amethystus veterum nunc Granati nomen obtinet."[5] We cannot resist such an inference if we carefully examine some of the characters given by Pliny of certain varieties of this gem. Thus he describes the Indian as "having the exact tint of the royal purple, and the dyers direct their endeavours to produce the colour, taking this gem for their pattern. For it diffuses a hue softly gentle to the sight, neither does it flash upon the eye like the Carbuncle." Be it remembered that he has already described the best purple of the colour of clotted blood, dark in one aspect, bright red if viewed against the light. Again, we find "the fourth sort has the colour of wine;" now Italian wine is generally (and more especially that grown about Rome) of the richest Burgundy colour, than which nothing more accurately expresses the rich hue of the common Pyrope. It is a manifest absurdity to suppose a comparison between the bluish red of our Amethyst and the unmixed red of various shades peculiar to any sort of wine.[6] The Carbunculus of Pliny was doubtless our Spinel Ruby, and to the eye alone (the sole criterion of the ancient lapidary) the Oriental (Syrian) Garnet and the Spinel are almost undistin-

[5] There can be no doubt that the amethyst (purple quartz) of the moderns was considered by the ancients as one species of their Jaspis. In no other way can Pliny be understood (37), where, describing the latter, he thus classifies them: "Minus refert nationes quam bonitates distinguere. Optima quæ purpuræ aliquid habet; secunda quæ rosæ; tertia quæ smaragdi." And such a classification is perfectly accurate, all being equally quartz crystals, variously coloured by different metallic oxides. Again, he alludes to another *jaspis* resembling the sard; another mimics the viola (or pink cyclamen); the Cappadocian was a sky-blue mixed with purple (ex purpura cærulea), but dull and not lustrous. The last definition applies exactly to our German amethyst.

[6] Theophrastus includes (30) τὸ ἀμέθυστον in his list of ring-stones, adding that it is like wine (οἰνωπὸν) in colour.

guishable from each other, as I have had frequent occasion to observe in looking over examples of both species which have come down to us from Roman times with engravings upon them. Again, in no other manner is it possible to understand what kind of precious stone Heliodorus is describing as set in the king of Ethiopia's ring (Æth. v. 13). "And so saying, he put into his hands a ring, one of the royal jewels, an extraordinary and astonishing thing, the shank being formed of electrum, and the beasil flaming with an Ethiopian Amethyst, in size about the circumference of a maiden's eye, but in beauty far surpassing either the Iberian or the British sort. For the latter blushes with a feeble hue, and is like a rose just unfolding its leaves from out of the bud, and beginning to be tinged with red by the sunbeams. But in the Ethiopian Amethyst, out of its depth flames forth like a torch a pure and as it were a Spring-like beauty; and if you turn it about as you hold it, it shoots out a golden lustre, not dazzling the sight by its fierceness, but resplendent with cheerfulness. Moreover, a more genuine nature is inherent in it than is possessed by any brought from the West, for it does not belie its appellation, but proves in reality to the wearer an antidote against intoxication, preserving him sober in the midst of drinking-bouts." This gem was engraved with a youthful shepherd and his flock, of which the tasteful bishop proceeds to give a pretty description, in which he again dwells upon the "golden" tints commingled with the flamy hues of the stone. The same interpretation must be put upon the more obscure language of the somewhat later Epiphanius in his 'Treatise of the XII. Stones of the Rationale,' where under IX. he gives "The stone Amethyst: this in proportion to its circumference is of a deep flame colour, or sometimes paler, sending forth out of the midst a vinous appearance. Of it there are various species: one of the sorts is very similar to a clear hyacinthus (Sapphire), the other to the murex-blood, *i. e.* Tyrian dye. They are found in the mountains and on the coast of Libya."

Even in the last century the common Amethyst was held in high estimation, when Queen Charlotte's necklace of well-matched Amethysts, the most perfect ever got together, was valued at 2000*l.*; at present it would not command as many

shillings, so vast has been the importation of late years of German Amethysts and Topazes (purple and yellow crystals of quartz), which are got in endless abundance from various parts of Hungary, Bohemia, and notably at Oberstein, where they are cut and polished by steam power, and despatched into all parts of Europe to be made up into cheap articles of jewelry. They are also found plentifully about Wicklow, in Ireland. Barbot mentions a crystal of this kind as recently brought to Paris of the vast weight of 65 kilos. (about 140 lbs.). When the gem was in fashion, it was formerly imported largely from the East Indies, and these were light coloured, the purple being shaded not equably, but extremely lustrous. The colour of the Amethyst can be dispelled by a careful roasting in hot ashes. Hence in the last century, when it was the great desideratum of the jewellers to obtain a suite of stones all exactly of the same tint, they were able to obtain this result by subjecting the several pieces to the heat for a greater or less time, until they were all brought to the same shade of purple. According to modern usage this is the only gem it is allowable to wear in mourning.

The artists of the Renaissance eagerly availed themselves of these huge and beautiful crystals to carve them into those fanciful yet elegant vases so acceptable to the taste of their age. The Parisian Collections offer the choicest specimens of their skill in this line. Barbot quotes a cup, shaped as a shell, seven inches long and deep, by six wide; also an urn eight inches high, fluted and elaborately decorated with engravings; both in the former treasury of the Crown.

This stone is one of the earliest enumerated in the list of talismans or gems whose native virtues were heightened by the figure engraved upon them, a superstition still in its infancy in the age of Pliny, when, although the medical virtues of many gems were generally admitted, yet the doctrine of their supernatural powers was as yet ridiculed by the learned as a figment of the credulous East. Thus under this head Pliny remarks that "the lying Magi promise that these gems are an antidote to drunkenness, and take their name from this property. Moreover, that if the name of the Moon or Sun be engraved upon them, and they be thus hung about the neck from the hair of a baboon, or

the feathers of a swallow, they are a charm against witchcraft. They are also serviceable to persons having petitions to make to princes: they keep off hailstorms and flights of locusts with the assistance of a spell which they teach." Where it may be remarked that the names of the Moon and Sun must have been the mystic names of these luminaries in a sacred *Oriental* language, for such in Greek or Latin would have been too simple for the faith of their dupes, and, besides, never are to be seen on any similar relics. Doubtless we have here an allusion to the ΙΑΩ and ΑΒΡΑΣΑΞ, words of that actual signification, and which in the following century appear on such countless multitudes of talismanic gems connected with Magian or with Egyptian superstitions.

ARGENTUM: Ἄργυρος: *Silver.*

In the ancient world Silver was to the same extent the peculiar production of Europe, that Gold was of Asia. Herodotus makes no mention of any mines of silver in the latter country, and even expressly notices that the Scythians and Massagetæ, though abounding in gold, had no silver at all. But he speaks of Mount Pangæus in Thrace as having most productive mines of both metals, and mentions a silver-mine adjacent to the Lake Prasias in Macedonia that used to bring in a talent of metal (60 lbs.) in weight per day to Alexander I. (v. 17): a proof this of the extraordinary richness of the ore, considering the little skill of the Greek in reducing this metal.

But the most extensive and richest mines of silver were in Mount Laurium, or rather the chain of hills occupying the southern extremity of the Attic peninsula. Xenophon (De Vectigal. iv.) describes these mines as having been worked from time immemorial, as was testified by the heaps of rubbish and slag, rivalling in height the natural hills. The earliest coinage known to the world was the produce of these mines, for the old tradition is evidently (on the testimony of the coins themselves) well founded which makes Phidon King of Ægina (B.C. 869) the first that struck coin. Lucan quotes a tradition, pointing to a not very distant locality, which assigns this invention to Itoneus, a Thessalian king. These mines at Laurium were in their fullest activity just before the Peloponnesian war. Xenophon mentions that Nicias (the unfortunate commander of the expedition to Syracuse) kept a thousand slaves, always maintaining the same number, whom he hired out to a Thracian, Sosias, for one obol per man per day clear of taxes. This would make 166⅔ drachmæ daily, or about 7*l.*: a large sum, indicative

of corresponding profits to the Thracian lessee, who had to feed these miners, pay a royalty to the state, and supply all the other expenses of the mining operations. Similarly Hipponicus had six hundred slaves let out at one mina (3*l.* 5*s.*) per day, and Philemonides half that number. These wealthy Athenians were too cautious to embark in mining operations themselves: the actual farmers of the mines were usually foreigners, as in the case named—Thracians, who had studied the business in the ancient mines of their own country. The state encouraged these operations as much as possible by allowing foreigners to embark in them on an equal footing with the natives. These lessees under the state paid their *royalties* in the form of a poll-tax on every slave employed; an excellent plan for preventing their cheating the revenue. Xenophon could devise no better expedient for restoring the Athenian finances than that the state should purchase slaves as a national concern and let them out to the contractors, as the safest and most profitable of all investments of the public money. There was no fear of the mines ever being exhausted: no miners had ever come to the end of the veins, however deep they had sunk their shafts, and the range was equally productive wherever opened. However, in Strabo's time, four hundred years later, the mines were completely worked out. They had become a thing of tradition by the middle of the second century: Pausanias speaks of Laurion, "where the Athenians had silver-mines formerly."

Diodorus contrasts the poverty of the Attic mines with the certain wealth of the Spanish, saying that mining in the former was a complete lottery ("enigma"), where many were not merely disappointed, but lost all they had in the first outlay; whereas in the latter they make profits beyond their hopes. The woods clothing the mountains having been completely burnt off by an accidental fire (whence called Pyrenæa), the silver-ore near the surface was melted, and flowed out in streams. This the Phœnician traders obtained for a trifle from the ignorant natives; and, their ships being overloaded therewith, they weighted the anchors with silver in place of the lead first put in them. At last the Iberians set to work the mines themselves. These were of copper, silver, and gold. From the copper-ore

they got one-fourth pure metal. "Some of the silver-miners get in three days as much as an Eubœic talent (65 lbs.) per man. For the whole ground is full of shining silver-dust. At first the natives worked the mines; but after the Roman conquest a multitude of Italians occupied them. These buy vast numbers of slaves whom they employ in the works, opening new shafts, sinking down, and driving levels after the course of the veins, many stadia in extent. The further they go, the more splendid veins do they find, full of silver and of gold. The water flooding their workings they raise to the surface by the screw of Archimedes; having a succession of these on different levels, until they bring it up to the mouth of the shaft. The slaves are kept at work both day and night, are cruelly treated, and die off very fast. One singular thing is, that none of the mines are of recent origin, having all been opened by the Carthaginians when masters of the country. By the revenues derived from these mines they were enabled to carry on their long wars against the Libyans, Sicilians, and Romans, entirely by the aid of mercenaries. For of old times the Phœnicians were famous for finding out gain, and the Italians for leaving nothing to anybody else."

Strabo, his contemporary, has a curious note, that, although the Laurian mines were actually worked out, yet the improved state of metallurgy allowed a certain profit to be extracted from remelting the old slag, which had been very imperfectly freed from the metal: a sure proof of the great facility with which it had been raised in former times. This Attic Silver was contained in a lead-ore: the latter metal the smelters could but imperfectly separate, hence the leady appearance of the old Greek coinage.

Of Silver-mining amongst the Romans a lucid account is given by Pliny (xxxiii. 31). Silver was found more or less in every part of the empire; but the Spanish mines bore by far the first rank. These had been opened by the Carthaginians, and were still as productive as ever. That called Bæbalo had yielded to Hannibal, who opened it, 300 lbs. in weight per day. By Pliny's date the galleries had been carried a mile and a half into the hill; the Aquitanian labourers, working in spells (the time regulated

by the burning of a lamp, "lucernarum mensura"), pumped out the water without intermission by day and night in such quantity that it formed a river. "The exhalations from the mines were fatal to all animals, but more particularly to dogs," which shows they were troubled with the choke-damp. Some ore, called "Crudaria," was found immediately below the surface. The earlier miners used to dig no farther after they came upon alum (which mineral is here meant is not easy to explain); but afterwards, having discovered that copper lay beneath this, there was no limit to their search.

Polybius (xxxiv. 9) describes the silver-mines near New Carthage as of vast extent, occupying a circle of 400 stadia (40 miles), and employing 40,000 miners, who produced to the Roman treasury 25,000 drachmæ per day (or $260\frac{5}{12}$ lbs. Troy). The ore was broken small, and sifted into water; the sediment again pounded, the operation being repeated five times; the residuum was then melted, and, "the lead being poured off," the silver was extracted pure.

Had the Romans been aware of the mineral wealth of Silesia, they would have certainly made more vigorous efforts for the conquest of Germany; but the rich silver-mines of that province were first opened in the 10th century. In Norway also the Kongsberg mine during the last century rivalled in productiveness any of the Mexican.

Silver was never met with native, or even betraying its presence, like gold, by particles sparkling in a stony matrix: it only occurred as a reddish or ash-coloured earth. This could not be reduced unless it were mixed either with lead or with lead-ore, called Galena (Sulphuret of Lead), usually met with in the same mines. (The chief produce of these mines at present is silver-lead ore.) By the same operation, in the smelting, part of this mineral was reduced to lead, whilst the silver floated on the top, like oil on the surface of water. Pliny (xxxiv. 47) notices the separation of the silver from the lead in the same melting at different temperatures—a property but recently taken advantage of in the extraction of silver from argentiferous lead-ore (Pattinson's Process), but evidently known to the profit of the old Spanish miners. "Lead is either produced pure naturally in

an ore of its own, giving nothing else; or else united with silver, and the two ores are smelted together. Of this mixture that which first runs off in the furnace is called 'Stagnum;' the next that comes off is Silver: the residuum in the furnace is galena, amounting to a third of the charge of ore. This melted over again produces Lead, with a loss of two parts in nine." (This residuum, therefore, must have been Litharge, or lead oxidised by the great heat required to smelt the combined ore. As charcoal was the only fuel then used, this oxide gained sufficient carbon in the second melting to convert it into metallic lead.)

The ancients, who classed minerals by the eye for the most part, considered Quicksilver as a rare variety of this metal, occurring in the same mines, like a running issue, always liquid, proceeding from the metallic veins, "vomica liquoris æterni." They considered it as something quite different from the Hydrargyrum extracted from the Minium (Sulphuret of Mercury) by sublimation. This Minium,[1] the Vermilion used in painting, Theophrastus relates, was, eighty years before his time, discovered by Callias, an Athenian, who, from its brilliant red, imagined it contained gold, and, making experiments upon it, failed in that attempt, but obtained the pigment. This was in a silver-mine at Ephesus. But when Pliny wrote, Minium was brought to Rome only from Sisapon in Bætica (Almaden): the mine being the property of the State. The ore was not allowed to be prepared on the spot, but brought in sealed packages to Rome, where it was ground and washed; and the price fixed by law to 70 sesterces (17½ denarii) the pound weight. As much as 2000 lbs. were annually exported from Spain. This kind was exclusively used as a pigment: an inferior sort, the Secundarium, found in the same mines, only assumed a vermilion colour after it had been roasted: this was used for adulterating the native Minium, and also for making Hydrargyrum.[2] This

[1] *Miniaria* (fodina), the quicksilver-mine, is the source of the Italian "miniera," and of our "mine."

[2] The Romans made a distinction between the *argentum vivum*, native mercury, which flowed in a pure state at once out of the vein, and the *hydrargyrum*, extracted from the sul-

was extracted in two ways: either by the *wet process*, by pounding the minium in a bronze mortar with a pestle of the same metal; or by *sublimation*, being placed in an iron saucer (concha) inside an earthen pot, having a top carefully luted down: then a fire being made under the pot and blown with bellows, the quicksilver sweated in drops through the pores of the earthen covering, and was wiped off and collected.

The Stimmi or Stibium met with in the silver-mines, "like a froth, and bright white," of two kinds, the male and female—the former rougher and lighter and more sandy in texture, the latter brighter and full of cracks—was our Sulphuret and Oxide of Antimony, which, on the same account, the Germans term Spiess-glass or Rod-glass. It was in great use as a desiccative for ulcers, and also as a medicine for the eyes.

The oxide skimmed off the silver in the melting-pot, known by the Greek name Helcysma, also entered into the ancient pharmacopœia as a caustic and desiccative.

The alloy in the Greek silver coinage generally appears to have been nothing more than the lead their refiners had not sufficient skill to get rid of: nevertheless the Athenian currency was distinguished above all the rest for its purity. Hence Xenophon's remark (Vect. iii.) as to the profit to be got upon the exportation of it to foreign countries: adding, what seems unaccountable, that the money of other states had no currency out of their own limits.[3]

The Romans adopted a silver currency at a somewhat late period of the Republic, not until 269 B.C. Their standard was as high as the Greek during the Republic and throughout the reign of Augustus. But, notwithstanding the vast supplies flowing into the treasury from Spain, the standard of the silver coin rapidly fell.[4] Under Vespasian the alloy was $\frac{1}{8}$, under the

phuret by art, and considered the former infinitely the best. There is, however, no real difference.

[3] Hence the remark of the philosopher quoted by Diogenes Laertius, that the Attic pieces, ill struck, misshapen, were preferred, on account of their intrinsic goodness, to the elegant and round-coined mintage of Alexandria; alluding to the mintage of the Ptolemies, the best executed on the whole of any in the Greek series.

[4] Antony, notices Pliny, alloyed his denarii with iron; to harden the coin it would seem, for the lightness of the iron would leave little margin

Antonines ½, under Severus about ½; after which time there seems to have been no fixed standard, some denarii being worse, others apparently better than the last mentioned.[5] But after Spain had been lost to the state, in consequence of the usurpation of the various pretenders to the empire in the time of Gallienus, the silver currency altogether vanishes, and is replaced by *Billon*[6] denarii, in which the *silver* forms but one-fourth, or even less, of the weight of the coin. These pieces, extremely bright when fresh, in consequence of the silver being forced upon the surface by the pressure of the stamp, become quite coppery after a little circulation. Pinkerton ascribes the evident scarcity of silver coin under the Empire, even in its most flourishing times, to the drain of specie towards India for the purchase of precious stones and silk, and compares it with the same beginning to be sensibly felt in his own times (1770), occasioned by the purchase of tea. After an interval of fifty years Diocletian, having reunited the dispersed members of the empire, re-established the silver currency upon its original footing; and this continued, though the weight of the denarii gradually lessened, until the fall of the Western Empire.

Diocletian's restored silver denarii are ninety-six to the Roman pound, hence many of them bear XCVI within a wreath on the reverse. They, being eight to the Roman ounce, would equal 54 grs. Troy each. But his successors, though they did not again debase the standard, rapidly curtailed the weight, so that few exceed 30 grs. Again, double denarii were coined, of which one thousand were equivalent to a pound of gold: hence styled

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for profit upon the result. This strange tradition is quite true; the accurate Pinkerton states that he had seen a legionary denarius of the Triumvir fly to the magnet like a bit of steel.

[5] The weight also diminished fast. Those of Augustus average 60 grs.; of Vespasian and his sons, 50; and this weight seems to have been the standard down to Caracalla, who issued double denarii (on the model, apparently, of the older didrachms), weighing about 90 grs., the denarii being about 45. Gordian only coined the large, the pecunia majorina of the edict of Constantius, and even this module declines under Gallienus to 65 and 70, when the silver coinage ends, base though his be.

[6] *Billon* signifies the mixture of either gold or silver with more than half its own weight of alloy. Some derive it from the Spanish *vellon*, some from *bulla*, others from *vilis*, all equally wide of the mark.

milliarenses. The few denarii coined by Justinian and the Italian Goths seem intended for 20 grs. Roman, but only equal 15 Troy. These light denarii were the parents of the Anglo-Saxon silver penny (of the same weight), a coin that can now boast, through its English line, an unbroken succession of 1300 years.

The Byzantine emperors, virtually an Asiatic race, from the very beginning coined but little silver: after the 5th century their currency (with exceptions not worth noticing) consisted entirely of gold issued largely in small subdivisions, *trientes* or thirds of the aureus,[7] and copper beginning with enormous clumsy *folles* intended to remedy the absence of the denarius and its half the victoriatus.

The chief luxury of the Romans connected with this metal lay in the accumulation of plate chased and embossed by Grecian artists. These appear to have worked during the two centuries ending with Pompey's times, under whom flourished Teucer, the last of any note. Pliny has given a full list of these artists and their principal works.[8] These consisted either in complete vessels wrought out and embossed by the hammer in the Repoussé style, or in small separate chasings in solid metal, intended to be set in pieces of plate or similar articles: hence called Emblemata. After Teucer this art suddenly became extinct, its place as a branch of high art being probably taken by cameo-engraving, which now occupied the same class of artists, the Cælatores, and supplied the same uses, as the emblemata. Hence in Pliny's age the old chased plate was valued as a curiosity alone, and fetched the same extravagant prices, though the chasings had become entirely obliterated by time and wear. After this the luxurious vied with each other in the production of the largest dishes in silver—the weight alone being the object in view. This was the first form of extravagance in which the newly-acquired treasures of the Republic were expended, the fashion arising to possess dishes that should

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[7] Or solidus, or hyperpyrus, hence perperus in Low Latin. It stood for many centuries at 60grs. = 12 shillings.

[8] For the history of this remarkable art see *Cælatura.*

weigh one hundred pounds each; and of such, previous to the First Civil War in Sylla's time, there were known to have been a hundred and fifty and more in existence at Rome, possessions to which many a wealthy man owed his proscription. But these were far exceeded in magnitude by others produced by the ostentation of the imperial freedman. Pliny quotes the instance of Drusillanus, a slave of Claudius, and the treasurer of Hither Spain (the province containing the mines), who had a dish made in a forge built for the purpose, weighing 500 lbs., with eight plates to match it, weighing together 250 lbs. Whereupon Pliny asks how many of his fellow-slaves it took to carry in this dinner-service, or who were the guests it was set before?

The Egyptians at some unknown time invented the art of *Niellatura*, in long-after ages carried to such astonishing perfection by the Florentines of the Quattro-cento school. This may be deduced from Pliny's somewhat obscure statement (xxxiii. 46): "Egypt stains silver in order to see her darling Anubis upon the plate; and *paints* the metal instead of chasing it." The pigment was made by adding one-third by weight of the finest copper, and as much of sulphur, to some silver (in filings probably): this mixture was roasted in a pot with a luted cover until the cover opened of itself. It seems to have made a substitute for enamel, afterwards applied to the metal in the way described below.

The Niello of the Florentine goldsmiths, so justly celebrated, was a somewhat similar composition; Cellini's recipe for it being to take one part silver, two copper, three lead, melt them together, and pour into an earthen pot half full of sulphur: the mass to be ground up when cool, and used like enamel. To apply it the design was first engraved in line upon a polished silver plate, precisely after the manner of a copper-plate (which style of engraving originated in this); the powdered niello was then laid on the plate and fused upon it by the application of heat. The superfluous mass being removed by polishing, the lines in the silver came out filled with a dark violet: the μέλαν of the Byzantines, the *negellum* of the later Latins—whence the name given to the art. The delicacy of the best class of works in this style is beyond conception. They have also the weighty

recommendation of imperishability; counteracted, alas! in too many cases by the intrinsic value of the basis.

This art was applied by the Asiatic metallurgists to the decoration of armour as early as Homer's days, for he describes (Il. xi. 25) Agamemnon's breastplate as inlaid with outlines οἶμοι, ten μέλανος κυάνοιο, "of dark azure," twelve of gold, and twenty of tin. In the former material were three dragons on each side, stretching themselves up towards his neck. This was a present from Cinyras King of Cyprus, an island either belonging then to Egypt, or in very intimate relations with that kingdom. The band of his shield was adorned with a triple-headed dragon in the same composition. In Pliny's times (l. c.) it was applied to triumphal statues, and (54) he refutes the popular notion that statues in silver were unknown before the Augustan age, quoting such statues of Pharnaces and Mithridates as carried in Pompey's triumph.

Small works of the Lower Empire often occur with devices upon them in a true niello, fused into an engraved outline; and some copper plaques have come to my knowledge with figures done in this composition: but we have no remains of any artistic value before it was taken up by the Florentine artist-goldsmiths. The Byzantines applied niello to the decoration of jewels in gold, in cases where it was not convenient to introduce the *cloisonné* enamels they loved so much as embellishments to that precious metal; and of this class also examples are yet extant.

But the latter style had been long before in use, for Heliodorus, writing in the 4th century (Æth. iii. 4), describes the zone worn by his heroine Chariclea as "a work in which the artificer had locked up the whole of his skill, having never before wrought such a piece, neither being able to do so a second time. It was made like two serpents, their tails tied together behind the wearer's back in a knot, whilst their necks, passing underneath her breasts, were entwined in a tortuous noose; whilst their heads, allowed to pass through this tie, hung downwards on either side as an addition to the fastening: you would have said that the serpents did not *seem*, but actually did crawl: yet they were not terrific with a menacing and cruel aspect, but relaxed by a gentle torpor, as though lulled to sleep by love upon the

maiden's bosom. Their material was gold, but their colour violet; for the metal was darkened by art, in order that the deep colour united to the gold might set off the asperity and the alternation of their scales."

As before observed, this was pre-eminently the art of the Italians of the 15th century, or, in other words, before it was driven out of the field by the revival of gem-engraving. Maso Finiguerra, who flourished at Florence circa 1460, has always been regarded the first in this department. Vasari also bestows the highest praise on the nielli of Francesco Francia (b. 1450), "who often on a plate only two fingers high by a little longer put twenty figures equally well drawn and beautifully finished." These, with his enamels and pieces of plate executed for his patrons the Bentivogli, tyrants of Bologna, were lost or destroyed upon the expulsion of that family. Cellini mentions that when first commencing business, hearing old people talk of the wonderful performances of Finiguerra in this line, he was seized with a desire to emulate him, in which he perfectly succeeded. As we have only his own word for it—and his judgment upon his own merits is far from impartial—the fact of his eminence in niellatura may well be doubted. We have, indeed, abundance of small silver trinkets of his age, rings, buckles, &c., but they cannot claim to be considered works of art, but only articles of a manufacture. The art yet lingers in its lowest form in Petersburgh, confined to the production of rude decorations upon the lids of snuff-boxes.

CÆLATURA: Τορευτική.

All decorative metal-work was originally executed with the hammer alone: hence its designation *σφυρήλατον*. So made were the first statues seen in Greece, ascribed to the mythical Dædalus, or his pupil Learchus, the several parts being hammered out separately and then put together by means of rivets, the art of soldering not being as yet invented. Some of these were seen by Pausanias, as the Jupiter in Sparta, "the most ancient statue in Greece" ('Laconica,' iii. 17).

Long after the art of casting statuary in moulds with cores had superseded this primitive and tedious process, the hammer continued the sole instrument for works in the precious metals, whether statuettes or bas-reliefs. Everything belonging to the Assyrian, the Etruscan, and the Greek schools (as long as the period of fine art lasted), is wrought by the hammer. The substance is the thinnest possible plate of the metal; the small intrinsic value of the object, and the infinite taste and skill expended upon it, convincingly bespeak the times when gold and silver were extremely rare, but skilled labour very abundant.

This kind of work, aptly termed by the French *repoussé*, was thus done: the plate, being laid upon a yielding substratum (a kind of cement), was beaten with blunt punches of various forms into a series of hollows roughly making out the intended figure. When the metal was taken up, these indentations formed a rude relief on the other side, which by dexterous manipulation and the finishing touches of the graver produced a complete work; and that speedily, under the hand of a master. Figures in full relief, like the exquisite tiny Cupids so frequently depending from the Greek earrings, were made in two halves, and then

soldered together.[1] This art also was revived and carried to extraordinary perfection by the Italians of the 16th century;[2] they even went beyond the ancients, and applied it to steel for casques and bucklers of parade, of which examples of incredible excellence are to be seen at Florence, Paris, and one in the Tower armoury. The mode of applying the process to gold is minutely laid down by Cellini in his *Oreficeria:* his early reputation was acquired by medallions executed in this manner. His Atlas in full relief made for Ginori, being afterwards presented to François I., was the reason for that king's summoning him to his court.[2]

The Greeks called working in relief τορευτικὴ, in whatever metal;[3] but the particular branch working in silver came into high repute under Alexander's rich and luxurious successors. These artists the Romans called *crustarii*, from the small relievi, *crustæ*. The latter were more generally termed *emblemata*, from the mode of their application to the surfaces they decorated: being let into frames of ornamental work soldered upon their exterior, so that the emblema could be removed at pleasure: a mode of spoliation in which that unscrupulous amateur Verres is accused of having delighted.[4] The head of the profession was Mentor; for two bowls by him Crassus paid one hundred sestertia (1000*l.*), a piece of extravagance which he declared he had always been ashamed to enter in his accounts. His four pair of vases (the masterpieces it would seem) had perished before Pliny's age in the burning of the Temple of Ephesus, and the

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[1] Melted mastich was lastly run into the inside of these fragile creations to strengthen them against pressure.

[2] The art survived down to the middle of the last century, being extensively applied to the making of the embossed watch-cases then the fashion, many of which in gold are perfect works of art. Afterwards, an old Roman goldsmith informed me, who remembered the last days of the art, an expeditious substitute was devised, by taking from the wax model a hollow matrix in "fusible metal," into which the gold plate was beaten with a *leaden* punch, and the relief afterwards finished with the graver.

[3] Of which the British Museum possesses the two finest examples extant; the "Bronzes of Siris," the shoulder-plates of a cuirass embossed with heroes combating amazons; and the yet more wonderful mirror-case, also in bronze.

[4] Of his doings in this line Cicero gives a most humorous account. (See Verrin. iv. 24.)

Capitol. Next to him came Acragas, Bœthus, and Mys, all Rhodians. Their best works were still preserved in three of the temples of that island; they were bowls, *scyphi*, with reliefs of Centaurs and Bacchantes. The most admired piece by Mys was a group of Sileni and Cupids: of Acragas, a hunting scene. After them came Calamis, Antipater, "who seems rather to have planted in reality his drowsy satyr on the vase, than to have chased his figure," Stratonicus of Cyzicus, Tauriscus, and others. In Pompey's time Pasiteles; Hedystratides, famous for his battle-pieces; Zopyrus, celebrated for his Areopagites and Trial of Orestes upon two bowls, valued at 12,000 sesterces (120*l.*); and lastly, Pytheas, of whom a piece only weighing two ounces, the Rape of the Palladium, sold for 10,000 denarii, (400*l.*).[5] The same artist was noted for very small cups embossed with cooking scenes, *magiriscia*, made so very thin that it was impossible to take a cast from them for fear of bruising the relief. The art afterwards, says Pliny, died out all at once: so that the old work came to be valuable for its antiquity alone, even though the subjects were completely defaced by wear. For this he assigns the reason (49), "At present *anaglypta* chiselled work is all the rage, in which the silver is cut away around the outline of the design:"[6] in fact, executed exactly as a cameo, whence no doubt the change of taste. It must be confessed that for use this carved work in flat relief was vastly preferable to the thin repoussé work so easily damaged, so readily detached from its vase. The latter point Cicero illustrates by drawing a ludicrous picture of Verres at a dinner given him by Eupolemas, a Sicilian, appropriating before the eyes of the astonished host and company the emblemata from the only two vases so adorned that were exposed to his observation: and how he served Pompeius Philo the same trick with his single dish that he ventured to produce, who had fancied himself secure as being a "Civis Romanus." Pliny notes that Zenodorus, the statuary of Nero's days, copied for

[5] Crassus had also pieces that had cost him 6000 sesterces (60*l.*) the pound Troy. It is amusing to find these amateurs never able to separate the notion of the intrinsic from that of the artistic value of the silver.

[6] Nunc anaglypta asperitatemque exciso circa linearum picturas quærimus.

Dubius Avitus, governor of Gaul, a pair of vases made by Calamis, so exactly, that the difference between them was hardly perceptible: a proof that the repoussé work had not gone out of fashion for want of artistic ability to execute it, but solely on account of its unsuitableness to the service of the table.

Rare indeed, if any, were the specimens of the plate of the Greek school that had escaped time and the melting-pot, until a fortunate discovery in 1830 enriched the French Bibliothèque with some pieces of the finest quality. A Norman peasant, one Tronchin, struck, in ploughing his field at Bernay, upon a large tile covering a hoard of silver articles weighing over 50 lb. (25 kilo.). It was the treasure of the temple of Mercurius Cannetonensis, the local god (as the dedicatory inscriptions on many of the articles attest), hastily buried in some time of trouble, and never reclaimed. Of these a pair of Canthari have emblemata in the purest Greek style, as early as Alexander's epoch; representing subjects connected with the Mysteries.[7] Two pairs more have Bacchic scenes and symbols: some others bear decorations in the same style; but the most important are the two œnochoæ or tall flagons, "Cellini-shape," in modern phrase, embossed with scenes from the Iliad, whose style refers them to the epoch of Pasiteles. With them were found two admirable statuettes of the god in the same metal, and executed by the same process, one of them being the most important known in silver. The pieces of Roman workmanship declare the more practical character of their epoch. They are mostly large, flat dishes, having for ornament a chasing in the centre. But this chasing is solid and strong, being first cast, and then tooled up according to the modern practice.[8]

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[7] Or to some great man's horoscope. Each vase bears two groups, one the *pendant* to the other; an aged female seated, and a man standing in conversation with her, or the converse; between the pair stands a square monumental cippus, supporting a lyre or a mask.

[8] The Iliac vases were the offering of Domitius Tutus. The later pieces bear truly Celtic names, e. gr. Camulognata Coigi filia—Maxuminus Carantini filius—L. Lupula—Jul. Sibyla—Ex test. Plac. Doctrigis—Germanissa—Combaromarus Buolmui fil.—Dom. Tutus also gave many of the plainer pieces. For a detailed account of these chasings see the admirable description of the "Trésor de Bernay," in Chabouillet's Catalogue des Camées de la Bib. Impériale.

Of the vast *patinæ* mentioned by Pliny, so difficult to conceal, so tempting to the spoiler, only four representatives survive, and those on a comparatively insignificant scale. At their head stands the circular dish of the Cabinet of France, long known as the "Shield of Scipio:" and according to the legend dredged up out of the Rhone by some fishermen in the year 1656. It is 28 inches (3 feet Roman) in diameter, and weighs 25 lbs. Troy (10 kilo.). The bas-relief upon it, the "Restoration of Briseis," was formerly understood of Scipio and the bride of Alucius, hence its popular name. The style of art marks the third century. Of the same date are that of Madrid, and the third at Geneva; but the reliefs on both are historical.

But the most interesting of these wrecks of imperial splendour is the Corbridge Lanx (at Alnwick Castle), so called from the place of its discovery. This differs in shape from the others, being an oblong, 19½ × 15 inches in dimensions, and weighing 159 oz.[9] The subject is the Pythia Herophile receiving the dictates of the Delphic god, attended by Themis, Pallas, and Diana; and the composition inclosed in a border of their various attributes. The spiral columns introduced in the architectural part prove this piece not earlier than the times of Severus.

Pliny observes it as a strange fact, that, though so many artists had got a high reputation for chasing in silver, not one was similarly famed for his working in gold. The reason may be, that at the time when these great artists flourished, gold was as yet too scarce to be so employed. But of gold plate chased in the later style, that above noticed as coming into use in Pliny's age, a vast, to us incredible, profusion, as will be noticed hereafter, graced the sideboards (*abaci*) of the Roman nobles. A faint idea may be formed of its costliness from the only example left, the "Patère de Rennes," now in the Bibliothèque Impériale. It is in form a shallow bowl, ten inches in diameter, and weighing

[9] The original weight was considerably greater, for it rested upon a shallow foot or basement, which was torn off and melted by the finder. It is marked, according to the Roman (and present) custom, on the bottom with the weight in *dotted* numerals, but their system here, as in other cases, has not yet been made out. I give them, therefore, as a problem for archæologists.

II II III I W IIII S XII

about forty ounces Troy. In the centre is an emblema, a spirited scene, the drinking-match of Bacchus and Hercules, containing eight figures—the gods, the Fauns, and a panther. It is enclosed within a frieze, displaying in low relief the triumph of Bacchus over his competitor, into which enter twenty-nine figures and five animals, elephants, panthers, goats. The broad rim is adorned with equidistant garlands, alternately of acanthus and laurel, in which are set sixteen aurei from Hadrian to Geta inclusive: or all the princes of the surname Antonini. This treasure was found in the year 1777, at Rennes, in digging up the foundations of an old house, deposited in a vault together with a heap of coins from Nero downwards; and what is of interest as marking the time, and perhaps occasion of its concealment, a necklace made of aurei of Postumus, set in frames of open work.[1]

The foregoing remarks on the extreme rarity of antique cælaturæ will surprise many archæologists who behold the numerous silver vases, all supposed discovered in Pompeii or Cumæ, that have within the past twenty years enriched so many cabinets both *national* and private. The phenomenon may be accounted for by the existence of a complete manufactory of such relics at Naples, whence a continuous supply pours into the market through various artfully disguised channels. The imitations of the antique are wonderfully exact, and they are coated with an oxide, of a thickness that it would defy Old Time with the aid of his twenty centuries to rival.

MEDIÆVAL PLATE.

As soon as the social life of the Middle Ages had settled down into sufficient security for any class to enjoy opulence, and to venture upon the indulging in luxury, the nobles almost vied with their predecessors of the Lower Empire in the amount and elaborateness of the silver and even gold-plate under which

[1] The "opus interrasile," which Pliny mentions (l. c.) as then coming into vogue at Rome, when the value of the article was augmented by what the file had wasted.

their sideboards groaned. This display of wealth did not begin to exhibit itself, as the rule binding upon all laying claim to fashion, much before the beginning of the 14th century, for Dante introduces old Cacciaguida, but by three generations his senior, contrasting the simple frugality of his own times with the extravagance in architecture, dress, and mode of living of the poet's. But to look at the matter rationally, such a mode of investing surplus revenue, as soon as such a thing began to be, was the only one the times allowed besides that of burying it in the ground. To let out one's money at interest was a sin only fit for the Jews, to employ it in commerce was beneath the dignity of a noble, but to expend it in plate brought the gratification of vanity in prosperous times, and secured a bank to fall back upon in the day of trouble. Hence, until other modes of investment arose equally secure, easy, and more profitable, every one who did not hoard the actual coin like a miser, converted his superfluous income into plate: and this continued the rule in England late into the 17th century.[2]

It was, however, in the times first spoken of that luxury in this article ran wild with all the quaint extravagance of the age. What the strange genius of the Gothic designer tied by no rules could devise, and all the fantastic creations his great practical skill could effect in piling conceit upon conceit, now blazed forth in its full glory. A good idea will be obtained of the chefs-d'œuvre of this art-manufacture from the descriptions of a few pieces taken almost at random from the Inventory of the plate of Louis duc d'Anjou, drawn up between the years 1360 and 1368. It comprises 717 items, and the list then is incomplete, "several leaves being torn out," says Laborde, who has published it. Of such domestic plate only a few, and those the most inconsiderable relics, have come down to our times. The general destruction of the class is due to two causes. First came the complete change of taste two centuries later, consequent upon the Revival, which consigned to the melting-pot everything bearing the stamp of Gothic art, in order to remodel it into the semi-classic style then so zealously cultivated in all

[2] In the earliest London lotteries the prizes were given in silver plate.

decorative matters. Next succeeded the 17th century, that epoch of civil wars devastating the whole extent of Europe: the bitterest poverty, oppressing each land in its turn, sent every ounce of plate that was not consecrated, and wherever the Calvinists got the upper hand that too sharing the general fate, to the mint, to reappear in the rude coinage of the times[8] for the pay of troops, and to make the war support itself. It is needless to multiply examples: every one acquainted with numismatics knows how all the corporation and college plate of England was converted into the unshapely coins and yet ruder siege-pieces of the latter years of Charles I.'s reign. It was thus that the domestic plate entirely disappeared, the few examples left being the small articles either overlooked, or previously gone out of sight. Of that consecrated to religious uses, a tolerable sprinkling has been preserved: some was defended by the sanctity of the places containing it; some was in many cases rescued from plundering zealots by the precaution of its guardians, and restored to its wonted place in quieter times, and thus survived until its safety—though devotion, its former keeper, be extinct—is secured by its newly-created archæological value. Such pieces, however, being made for certain definite uses, generally to contain relics, are modelled after one pattern, that of a chapel, a coffret, or a bust, and exhibit little of the licentious ingenuity which designed the subtletics in silver that encountered the astonished guests at the tables of the dukes of Anjou, of their rivals of Burgundy, and, in a greater or less degree, of the wealthy merchants of Flanders and of England. The following items will fully bear out these observations: they are extracted from the vast mass of plate, mostly decorative, mentioned above.

"No. 76. A wheelbarrow resting upon a foot carved with vine-leaves, which rests upon iv little lions: the said foot is

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[8] What incalculable destruction of art, as well as of historic interest, was represented by the two hundred pounds weight of gold obtained by Cellini from the jewels of St. Peter's, which he melted down by command of Clement VII., when blockaded in Castel Santangelo by the Spaniards, in 1528! The hardly-beset pontiff was reduced to this expedient to save the precious stones belonging to these ornaments, which he sewed up in *his own clothes* and those of Cardinal Cornaro.

pointed before and behind, and at one of the ends is a man who has the handles in his girdle, and guides the said barrow; and he has on a fur hood, and the point of his hood comes over his forehead: before him is a woman who with her right hand holds the barrow, and in her left holds a Danish axe, and wears an old woman's hood, the which hood is after the fashion of Picardy; and on the said barrow is a cask tied with several straps, and the ends of the said cask are enamelled in green and blue with several little beasts; and the bottom of the barrow and the resting-place of the goblet are of the same enamel, without any difference: and in one of the ends of the said barrel is a tap like that of a fountain; and the said rest for the aforesaid goblet is with battlements, and iv leaves higher than the battlements; the which rest is fixed within the belly of the said cask, and does not take off. And the goblet which rests upon the said seat is of the same enamel above mentioned, and the bottom and the lid of the same enamel, and a little knosp in gold on top of the cover in the same enamel; and the foot, man, and woman, weigh iv marcs i ounce; and the barrow, the cask, and its rest, weigh iv m. v oz.; and the goblet and its cover weigh iii m. ii oz. The whole xii m. i oz. (or 97 oz. Troy).

"No. 78. A Lady, who has half of her body a woman's, the other half a wild beast's, with her two feet upon a terrace, enamelled blue, with little trees, stags, and hounds, and mouldings underneath: from the girdle of the said lady comes out a bull's head, the horns whereof she holds in her hands; and on the said head is a cup;[4] and at the ears of the said head, at the sides of the lady, and at the ends of her girdle, hang by little chains escutcheons of the Archbishop of Rouen and of Marigny. And the said lady is wrapped in a little mantle, split at the sides, and has a long hood upon her head, enamelled the same, both mantle and hood; and behind the said lady, on the back of the aforesaid beast, is the rest for a goblet, made with flutings; and the said goblet is of crystal, and is mounted on a foot of silver enamelled, with flutings and mouldings; and round the crystal are iv *Bats*. The cover is of crystal, bordered with silver, with flutings and

[4] The head forms the cup.

mouldings, and the knosp of vine-leaves, and the boss (of the stem) of the same is three-sided, enamelled in blue and green. The lady, the foot, the goblet and cover, weigh v m. vii oz. xii d. (47 oz. 12 dwts.).

"79. A Cock, forming an ewer, whereof the body and tail are of pearle; the neck, wings, and head, of silver, enamelled yellow, green, and blue; and upon his back is a fox, which is going to seize him by the crest; and his feet are upon a base, enamelled with children, who are playing at divers games; and he weighs altogether iv m. iii oz. (35 oz.).

"81. A great *languier* (tongue-tree) of silver-gilt, which has several branches, at the end whereof are xv serpent's tongues, and between the tongues, at the end of other branches, be stones of divers colours; also there be scattered about the said tree several stones hanging from little chains of silver and gold; and in the middle of the said tree is a great white *cameo*, and around this are iv other stones, to wit, ii garnets and ii green stones; and in the stem of the tree is a boss[5] engraved with leaves raised, and about the said boss be vi little enamels in blue, with a fleur-de-lys in gold; and inside the said stem, within, is a square basin, having underneath a square boss with iv enamels of birds in blue; the foot is a square entablature with iv enamels set therein, in which be ii serpents folded, and ii birds: towards the bottom it is moulded and fluted, and rests upon iv lion's paws. Weight of the whole v m. iii oz. (43 oz.).

"89. A Fountain, of which the foot rests on iv gilt paws, and underneath is a terrace in green, a little crossed (hatched), of which the enamel is green, and the fishes violet and yellow. And in the middle of the same terrace is a tree from whence issues a serpent winged, and in the top of the head of the same is a pipe, and a tap out of which the water issues. And at one of the ends of the said terrace is a little tree, whereon sits one ape clad in a coat and surcoat, very wide, and hath a hood upon his head, whereof the fur is violet, bedropped with drops of white, and the top of azure with white and red drops, with a pearl on the end;

[5] This *pommel* is the boss which usually surrounds the middle of the stem of a mediæval cup.

and the said ape holds in his left hand a fishing-basket, and in his right a fishing-line, wherewith he hath caught a barbel. And at the other end of the same terrace is another ape dressed and hooded the same as the first. And he holds in his right hand the tall pipe of the fountain, and drinks at it. And the basin above of the said fountain is enamelled in green with rabbits and dogs. And the said basin is supported on three branches, the leaves whereof be enamelled in green, blue, and yellow. And upon the said basin rests a goblet, enamelled on the outside with green and blue, with spaniels and children chasing butterflies; and the enamel is on the inside of the goblet as well as out. The cover outside is also enamelled, with children chasing butterflies, and has a knosp enamelled in azure, and weighs in all viii m. ii oz. (66 oz.).

"No. 165. A great Flagon, gilt and enamelled, on the belly whereof are ix enamels; and that in the middle is large, after the fashion of a rose, and in it there is a lady sitting on a chair, who has in her lap a basin, wherein are florins, and at each side of her are women to whom she is giving the florins; and under the feet of the said lady is written *Liberalitas:* and in the other enamels are the seven deadly sins; and the eighth enamel portrays *Vana Gloria:* and also there are viii half-circles, wherein be divers beasts. The sides are interspersed with several round enamels and wild beasts; and on the flat of the said flagon is a large enamel, round and blue, in which is an ancient lady sitting in a great chair, and under her feet is written *Theologia*, and all round are viii enamels, in which are the vii cardinal virtues, and to each one its name close to itself. The said flagon is upon a foot, high, carved, bell-shaped, set with iv enamels, wherein be men playing on divers instruments. The neck of the said flagon is in the fashion of a tower with vi pillars, and between every two are blue enamels; and the cover is tall, after the fashion of a steeple, with blue enamels, and from the top is fastened a chain, which goes to the straps by the hinge, and the straps are green, set over with large blue enamels, and between every two enamels are two others made like a J reversed, and they fasten the said straps to two little serpents which have been blue. Weight xxx m. vi oz. (246 oz. Troy)."

The *gold* plate consists of sixty-seven pieces, generally of more simple make; *hanaps* and goblets, dishes, cruets, spoons; including however, some curious items, as

"258. An Ewer of gold, whereof the foot is small and round, carved with *Saracenic letters*, and above this is a little boss round and plain: the mouth of the said ewer is wide, and the bottom pointed, and around its belly runs a lily carved with Saracenic letters. And at the cup are iii pipes, two above and one below: and the cover is carved and worked after the same fashion as the belly of the said ewer; and on the border of the cover are ix large pearls; and upon the knosp a large sapphire between two very big pearls and two sapphires. Weighs in all iv m. ii oz. (34 oz. Troy).

"203. A great Hanap of gold, tripod-fashion, which iii serpents uphold; and the said hanap and its cover are enamelled with serpents of their proper colours, entwined with our coat of arms; and on the cover is a large sapphire mounted in the knosp. Weighs in all x m. ii oz. (82 oz. Troy).

"210. An Ewer in crystal, mounted in gold, and on the cover is a little dove holding a pearl in her beak, and below are vi others, larger, weighing, gold and crystal, iii m. vi oz. (30 oz. Troy).

"256. A Goblet of gold, resting on a little round foot carved with Saracenic letters, and between the goblet and the foot is a round boss quite solid, and above this a lily, which embraces all the goblet, of which every leaf is carved with Saracenic letters, and at the bottom is an enamel of clear red, in which are iii lilies and iii Saracenic knots; and the field of the said enamel is chequered with the same colour, and the cover is of the same pattern. And between the boss and each lily are ii big pearls, 'à moulinet,' and the number of the pearls is xx; and upon the knosp is a large sapphire, set between two other sapphires and two very big pearls; and inside the cover is a small enamel with the same device as that on the bottom of the goblet. Weighs in all iv m. iv oz. xii d. (38 oz. 12 d. Troy).

"268. A saltcellar of a pearl-shell, made in the shape of a heart, and resting upon a little wheelbarrow of gold; and there is a woman who pushes at the wheel and holds the axles with her two hands; also a man wheeling the barrow; and around

the barrow several rubies of Alexandria, pearls, and other stones; and on the cover of the said salt is a knosp on which is a sapphire. Weighs in all i m. vii oz. vi d. (15 oz. 6 d. Troy).

"269. A very large chalice of gold; the foot of which is round and flat, adorned with mouldings, and on the flat of the foot is an enamel in bright red, on which is Our Lord on the Cross, Our Lady, and St. John; and in the middle of the stem is one round boss carved with leaves; and the cup of the said chalice quite solid, and weighs vii m. ii oz. xii d. (58 oz. 12 d. Troy). The *paten* also is quite plain, save that in the middle of it is an enamel in bright red of Our Lord in a cloud, sitting upon his throne, and showing his wounds; and the paten weighs ii m. iv. oz." (20 oz. Troy).

ASTERIA: *the Girasol Sapphire.*

PLINY thus describes this stone:—"The Asteria, holding the first rank by a natural claim, because it contains a kind of lustre within its substance like the pupil of the eye, and pours it from side to side, when held at an angle, as though it moved about in the inside, presenting itself now from one point, now from another. Also, when held against the sun, it reflects rays of a brilliant white, whence it derives its name (Star-stone). The Indian sort is hard to engrave upon. That found in Carmania is preferred to the others." No description can better suit our Girasol Sapphire, which in its native state is usually somewhat globose, being composed of concentric layers like an onion, to which arrangement its opalescence is due. In this state the light appears as a small orb shifting to and fro within the stone, according as it is turned; but when cut to a plane and polished, this orb becomes a most delicate star of numerous silky rays diverging from one centre. This variety is pale and milky: hence the propriety of the term "candicaules," applied by Pliny to its radiance. The character of extreme hardness restricts his description to this kind of Sapphire; for the Adularian Felspar, or Moonstone, answering to it in some respects, is extremely soft. This latter would indeed seem to be the next stone in his list, the Astrion, also colourless, approaching to Rock-crystal in appearance, produced in India on the coast of Patallene: "within from the centre shines a star with the light of the full moon." Indeed this exactly applies to the Moonstone, the Indian sort of which is incomparably superior to the European, and which presents upon its silver-grey surface that softly lustrous and full orb comparable to nothing except the luminary whence comes its name.

Plutarch ('On Rivers') says that the Sangaris produces the gem called *Aster*, which is luminous in the dark, and therefore called *Ballen*, "the King," by the Phrygians. Ptolem. Hephæstion describes a gem, Asterites, found in the belly of a huge fish called Pan, from its resemblance to that god. This, if exposed to the sun, shot forth flames, and was a powerful philtre. Helen used it for her own signet, engraved with a figure of the Pan-fish; and hence her conquests. The superstitious Byzantine evidently did not acquiesce in Propertius' axiom—

> "Forma nihil magicis utitur auxiliis."
> Beauty, resistless, craves not magic's aid.

Suidas quotes the same legend on the authority of Æsopus, *reader* to King Mithridates.

Some, adds Pliny, derive the name of Astrion from the stone's property of imbibing and reflecting the light of the stars, if held opposite to them. The best sort was found in Carmania, being subject to no defects. The *Ceraunia* was the same stone, but of an inferior quality. The worst kind of all resembled the light from a lantern (*i. e.* a very dull yellow).

The Astroites, celebrated for its magic virtues by Zoroaster, appears to be the same as the Astrion.

The Astrobolos also may be regarded as a Moonstone, for Sudines describes it as being like a fish's eye, and emitting a white radiating lustre in the sunlight.

The *Selenites* has a better claim, from its specified greenish tint, than any of the preceding to be considered the Cat's-eye.

The only conclusion to be derived from the brief notices of the several stones above quoted is that *Asteria* and similar names were used in different senses by authors of different times, but that Pliny understood by Asteria the same gem as we do at present—the Star-Sapphire; and that this, when possessing more purple than blue, was distinguished as the Ceraunia, or Lightning-stone.

The same stone appears also to be intended under the title of *Astrapia* (Lightning-stone), where, in a colourless or azure ground, as it were, the rays of lightning diverge from the centre.

AURUM: Χρυσὸς: *Gold.*

PLINY (xxxiii. 19) launches out into a set of reflections in his own quaint style, astonished as to what possible motives could have induced all mankind to make Gold, wherever known, the first and chiefest representative of value. It was and is indeed a strange coincidence in the notions of races, however remote from or unconnected with one another, that must early have puzzled every observer, and which still remains a problem admitting of no satisfactory solution. "It was not so accepted," pursues the old philosopher, "on account of its utility, in which point it yields infinitely to iron; nor for its heaviness or ductility, in which lead surpasses it (which however is far from true), nor yet for its colour, for *yellow* is not particularly admired in other things. The only reason, therefore, must have been its indestructibility, for gold is the only substance known that resists the fire, and is no more than improved by repeated fusion."

But this explanation, however satisfactory to the refined Stoic, is evidently much too transcendental to have influenced the primæval savage mind to which the metal hath ever been to the full as precious, though existing only in the shape of a personal decoration, as to the civilized intelligence which sees therein concentrated power, pleasure, and the veneration of his fellow mortals.

In spite of Pliny's dictum, the universal love must in the first instance have been won by its colour, a colour certainly the most gorgeous of all; and the reason is manifested in its name, derived from *Our* and *Or*, words denoting in many ancient languages the light of day; the earliest synonym for life and all that is to be desired. Some of the ancients had seen this, though

Pliny dismisses their explanation somewhat contemptuously with "manifesto errore eorum qui *colorem siderum* in auro placuisse arbitrantur." The golden nugget, glittering amongst the pebbles of the stream, caught the eye of primitive man, who saw in it the image of the sun, the oldest object of worship, and of whom gold has ever since continued the symbol. Besides its beauty, its ductility was another recommendation; the savage, though unacquainted with metallurgy, readily beat the pure ore into circlets to adorn his limbs: for this and copper are the only metals capable of being utilized by man in the first stage of civilization.

The rarity of gold is far from accounting, as some would have it, for its universal estimation. Amongst the primitive Celts of the Bronze Age, or the Mexicans when discovered by Cortez, *iron* must have been infinitely more novel and more rare, yet did it not on that account diminish in the least degree the ancient veneration for gold. And modern times are not wanting in similar analogies; platinum in the last century did not supplant gold either in the mint or in the jewellers' shops, though superior in those three great constituents of value—weight, ductility, and indestructibility,—besides being then of an equal intrinsic worth; neither in our own days did aluminium, though so highly recommended by its novel beauty of colour, perfect purity, and, at the first, extreme costliness. Rarity alone does not constitute value; amongst the precious stones, for example, there exist varieties pleasing also to the eye, vastly more difficult to be obtained in perfection than the diamond, and nevertheless they are sold for the merest trifle as mineralogical specimens. The golden flood poured into Europe during the past twelve years from California and Australia has not lowered the value of gold; and similarly, despite the *tons* of diamonds (things indestructible) imported since the discovery of the Brazilian mines a century ago, that gem yet maintains its original price and estimation.

From the earliest times of which we have any record, Gold was abundant amongst the nations of Asia Minor, as the constant allusions to it in Homer's poems sufficiently attest. He however does not in any place mention, even incidentally, as might have been expected, the sources whence it was then obtained. The first

hint as to these is obtained from Sophocles, who talks of purchasing the electrum of Sardis and the Indian gold ('Antig.' 1038), thus indicating the regions whence the supply was chiefly drawn. But Herodotus soon afterwards furnishes copious details concerning the gold-mines known in his times, some fabulous enough, others, resting upon his own knowledge, of the highest value for authenticity.

To begin with the latter.

The gold-mines in Thasos opened by the Phœnicians, who first colonised that island, made "a whole hill turned upside down in the search," between Ænyra and Cinyra, opposite to Samothrace. The Thasians were then working also mines in Scapte-Hyle, on the mainland of Thrace: these produced 80 talents yearly,[1] those in the island itself rather less (Her. vi. 46). A friend who visited the former locality not long ago was greatly struck at the enormous extent to which these ancient workings had been carried, still manifested by the vast heaps of earth and stones thrown up out of the "diggings." Whenever it was possible the ancients extracted all metals by open cuttings.

But infinitely more productive (as is always the case) than these Thasian *Mines* were the *gold-washings* (in modern phrase *Placers*) in the bed of the Pactolus, whose torrent carried down, it was believed, the gold-dust from Mount Tmolus. Some notion may be formed of the immense weight of gold collected by the Lydian washers (who appear speedily to have exhausted the deposit, as the productiveness of the sand is not afterwards alluded to by geographers), from the list of the Donaria made by Alyattes and Crœsus to various temples in Asia and Greece, all of which Herodotus had himself examined. This gold is properly termed by Sophocles Electrum, being very pale (similar to the Californian) from the native alloy of silver it contains. As it is a very difficult operation in metallurgy to separate this silver, the earliest coinage, ascribed with justice to the Lydians, and the oldest jewelry, as the Egyptian and Etruscan, is made

[1] These 80 talents = 4800 lb. Troy nearly, or 240,000*l.*, putting the Troy pound at 50*l.* Xenophon (Hell. iv. 8, 37) mentions also gold-mines of the Abydenes, near Cremaste.

in this pale gold. In fact, it continued to be used in the currency of the Greek cities of Asia Minor (Cyzicus, &c.) down to the times of Alexander: perhaps it was found to wear better in the circulation from the existence of the native alloy, and the saving of the expense in refining it was of importance to the mint. But it was from ignorance of the necessary process that the currency of the Gauls and Britons was struck in the gold just as it comes from the washings, which in these regions is of very low alloy, containing a good deal of copper as well as silver.

Herodotus (iii. 16) states it as a well-known fact that there was an abundance of gold found in the North of Europe, but had been quite unable to ascertain anything as to the mode in which it was procured, treating as quite unworthy of credit the tale of the Arimaspi, the one-eyed race, stealing it from the custody of the Gryphons. By North of Europe the north-east is intended, for his Arimaspi are placed to the east of the Araxes beyond the Issedones. Neighbouring upon the latter are his Massagetæ (i. 201), who have gold and copper in abundance, but neither silver nor iron. Hence it is pretty evident that these Scythian (or Cossack) tribes prosecuted with considerable activity the trade of washing for gold-dust the sands of the Uralian streams, still so productive in the same way. The Tartar tumuli covering the regions to the north of the Black Sea testify to the truth of these assertions by the vast quantity of gold ornaments, belonging to widely separated dates, which have long rewarded the treasure-seekers amongst the Cossacks. In some the corpses have been discovered wrapped up in a complete winding-sheet of gold, in others numerous rude figures of purely Tartarian origin; others again contain works showing some influence of Grecian taste.

He quotes on Carthaginian authority (iv. 195) a tale of an island, Cyraunis, off the Libyan coast, where there was a lake out of which girls drew up the gold-dust out of the mud by means of bunches of feathers smeared with pitch and tied to long poles. This story he seems to doubt. He likewise describes, on the same authority, how their traders bartered merchandise against gold in a certain locality on the African coast, beyond the Pillars of Hercules, probably near Senegal; or indeed

they might have coasted along as far as the Guinea coast. No further mention is to be found of gold from Africa; and, still more extraordinary, he does not allude to the very extensive workings carried on in his days in Egypt. The first may be explained easily: the Carthaginians kept all their gold at home, they had no metallic currency (until a much later period), and their exports were entirely manufactures, which in all their commerce they bartered against the precious metals.

As for India, whence the Persian kings derived a vast amount of gold as tribute, he had obtained no real information. The Persians told a story of the northernmost Indians, next to the Bactrians, who went out into the sandy Desert on camels to steal the gold-dust that was scraped up by enormous ants as big as foxes. But this metal was procured from Thibet by caravans, for India itself has no gold-mines, as the Greeks under Alexander found to their inexpressible disappointment. India drained the Roman empire of gold in return for its gems, spices, and silk, as it, with China, does Europe at the present day of its silver. The Periplus of the Red Sea gives an exact notion of the Roman trade with that country; the Indian exports were then precisely the same as they were a century ago, or before the cotton manufacture was established in Europe. The Romans paid for all this in ready money, having no commodities except amber, coral, copper, and lead, to exchange for these Indian productions.[2]

Yet, from whatever sources derived, the quantity of gold accumulated by the princes of Asia Minor was absolutely incredible. The gold-washings of the Pactolus alone furnished the gifts sent by Crœsus to Delphi; seen by Herodotus himself, and of which he has recorded the weight (i. 50). There were 117 oblong ingots (*ἡμιπλίνθια*), each 18 inches long by 9 wide and 3 thick. Of these four were of refined gold, weighing each 1½ talent (90 lbs.): all the others of "pale gold," *i.e.* electrum, and weighing each 2 talents (120 lbs.); a distinction proving clearly the difficulty then experienced in separating the native alloy from the metal.

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[2] "There not being a year in which India does not drain the empire of above half a million sterling (H S. DL), and sends in return merchandise sold amongst us at a hundred times the prime cost."—Pliny, vi. 26, xxxiv. 48.

Besides these he sent a lion weighing 10 talents (600 lbs.), which still existed, though it had lost 3½ talents of its original weight in a conflagration of the Temple; a basin weighing 8½ talents and 12 lbs. over. Also a female figure (his cook) 4½ feet high, weight not specified; besides many other objects in gold, sent there, to the oracle of Amphiaraus, and to Thebes. His offerings at Branchidæ were reported to have been the counterpart of those sent to Delphi; an arrangement quite in the spirit of those times. Such a vast weight of metal given away at once appears at first fabulous, but it is probable that Crœsus was the first Lydian king to explore these virgin gold-washings, and that every ounce collected went into his treasury. The first circumstance may be inferred from the fact that his father Alyattes, though equally anxious to testify his gratitude to the Delphic god, sent nothing in gold, but merely a large vase in silver, and a stand in iron, valuable solely as a curious specimen of workmanship. That the gold-dust was carried into the royal treasury in its native state appears from the curious anecdote of his allowing the Athenian Alcmæon, as a reward for his kindness to his envoys, to carry off from a heap as much as he could stow about his person (vi. 125).

Before the reign of Gyges the Pythian Apollo had neither gold nor silver, says Pliny (xxxiv. 10), quoting Phaneas of Eresus. Yet Herodotus (i. 14) makes Midas to have set him the example, by dedicating his own royal throne, which was still to be seen when he wrote, and a work to be admired. But Gyges far surpassed him, his being the greater part of the offerings in *silver* then existing at Delphi; and in gold he had presented, besides other articles, six craters, weighing in all 30 talents (1800 lbs.). After him came Crœsus, whose munificence has just been detailed. Of the Greeks the first to offer the precious metals was Gelo, at the time of the invasion of Xerxes, who gave a Victory and a tripod in gold. After him his brother Hiero made a donation exactly similar.

This account of the quantity of gold then amassed in a single treasury is corroborated by what he relates of Pythius, a Lydian, in the next century after the country had become subject to the Persians. This person, though a private man, offered Xerxes

(besides silver to an incredible amount) four millions, less seven thousand, of gold darics; each of which weighs one of our guineas (vii. 20).

The annual amount of tribute paid into the treasury of Darius was 14,560 Eubœan talents; out of which Herodotus remarks (iii. 95) that the gold-dust weighed 360 talents. This was paid in by the Indians, and equalled the entire assessment of all the other tributaries. That this "360 talents" signifies the weight appears from its reduction (in the ratio of 13 to 1) to Eubœan talents, in which denomination it came to 4680. This metal was melted down and run into pots of clay, which were then removed, and a round ingot (like a Chinese tael) remained until required. Besides this store of ingots, an enormous coinage of darics in fine gold had been issued in this reign, as the tale of Pythius shows, and continued to the epoch of the Macedonian conquest.

The Persians, in the reign of Justinian, had gold-mines at Pharangion in Persarmenia (Procop. Bell. Pers. i. 15). This was probably the source of the gold-dust so plentiful in Colchis in the earliest age of Grecian enterprise; for Pliny has a notice (xxxiii. 15) of "Saulaces king of Colchis, who, having got possession of a soil still virgin, extracted an immensity of gold and silver in the region of the Suani, and in other parts of his kingdom famous for the *golden fleece*." To the present day the Chinese miners in Australia employ sheepskins to collect the gold-dust in their washings.

An interesting account of the Persian treasury is preserved by Athenæus (xii. 514), extracted from the biography of Alexander by Chares of Mitylene: "Close to the king's bed there was overhead a chamber in which were always kept 5000 talents (300,000 lbs. in weight) of coined gold: this was called the king's pillow. At his feet was another chamber, somewhat smaller, where were always kept 3000 talents of silver coin: this was called the king's footstool. In the bedchamber there was a vine in gold, set with gems, spreading above the couch. This vine, according to Amyntas, had bunches of grapes made out of the most precious gems."

Polybius describes the Median palace at Ecbatana (x. 27) as having all its timber-work, though of cedar and cypress-wood,

the beams, the ceilings, and the pillars, entirely plated over with *scales* of gold and of silver; the tiles being all of the latter metal. Of these the greatest part had been scraped off at the time of the Macedonian invasion, and under Seleucus and Antigonus; yet still the temple of Aene retained its gold-plated columns and silver tiles; and a few ingots of gold and several of silver were piled up within it. All these "scrapings" were got together for the Royal mint, and fell little short of 4000 talents.

Agatharchides of Cnidos has left a most valuable description of the manner in which the mines in Egypt were worked, and the metal refined, in his own times (the reign of Ptol. Philometor, B.C. 181); but these operations had been carried on in the same district for many centuries before the establishment of the Greek power (Diod. Sic. iii. 13).

"In the furthest part of Egypt, on the confines of Arabia and Ethiopia, there is a place containing many mines of gold, which is procured by numerous workmen with vast hardship and expense. The soil being naturally black, and containing many veins and strata of marble, extremely white, and thus distinguished from the circumjacent materials, the superintendents set over the mine-works prosecute the search with a multitude of labourers. For the kings of Egypt collect those condemned for crimes, captives taken in war, persons ruined by false accusations, and therefore sentenced to imprisonment, sometimes alone, sometimes with all their families, and condemn them to the mines, thereby at once inflicting punishment upon the sentenced, and extracting vast profits out of their labours. Now these convicts, in great numbers, all in fetters, are kept at the works, not merely all day, but throughout the night also, getting no intermission of labour, and carefully guarded against escaping. For guards are set over them of foreign soldiers, and speaking a different language, so that it is impossible for the prisoners to corrupt any of their guards by speech, or by motives of humanity. The ground containing the gold they first heat with long-continued fire, and so render full of fissures, before they apply manual labour to it; but the rock that is soft and capable of yielding to moderate labour is cut down with the tools stonecutters use by myriads of these poor wretches. The entire operation is directed by the

engineer, who looks out for the proper stone, and marks it out for the labourers. Of those appointed to this miserable task, such as are of the strongest make break down the marble-like rock with iron pickaxes, applying no art to their labour, but mere brute strength, and thus cut galleries, running not in a straight line, but guided by the direction of the white veins. These men, in consequence of the crooked course of the galleries, work in darkness, and carry therefore lamps ingeniously fastened upon their foreheads; and frequently changing their posture, according to the arrangement of the veins, they break down and bring to the floor the fragments of the cut rock, doing this under the lash and cruelty of an overseer. Meanwhile the boys, creeping into the passages, throw up, with much toil, the broken mineral as it falls little by little, and carry it up into the open air at the mine's mouth. Here those above thirty years old receive from them a fixed measure of the broken ore, and pound it in stone mortars with iron pestles, until they reduce it to the size of a vetch. From these the granulated ore is taken by the women and the older men, who have many hand-mills set in a row, and, standing two or three together at the handle, they grind the measure given to them as fine as flour.

"Last of all the skilled workmen receive the ore ground fine, and complete the operation. They have a board placed somewhat sloping, on which they throw a small quantity of the dust, and pouring water over it they rub it. Then the earthy particles are dissolved by the water, and run off, owing to the slope of the board; but those containing the gold remain upon it in consequence of their weight. Repeating this frequently, first of all they rub the dust gently with their hands, afterwards they press it with coarse sponges lightly, taking up in this way the loose and earthy part, until the gold-dust is left behind unmixed. Finally, other workmen, taking from them the collected dust, according to weight and measure, place it in earthen crucibles, mixing in a certain proportion lead-ore and lumps of salt, to which they add a little tin and barley-bran. Then they fit on the cover of the crucible, luting it down carefully with clay, and bake it in a furnace five days and nights continuously. Then taking it out, and leaving it to cool, they find nothing of

the other materials left in the crucible, but get the gold quite pure, but slightly diminished in weight. The discovery of these mines dates very far back; probably they were found out by the ancient kings."

It may here be remarked that this method of refining the dust was a very perfect operation, as nothing can exceed the purity of the gold issued by the Ptolemies. Yet it is certain that the native Egyptian metal contained a large alloy of silver, for the jewelry of the independent dynasty is invariably of electrum, or little better. Sir G. Wilkinson has observed that wherever the rocks in any part of Egypt show veins of quartz they exhibit traces of former exploration by the ancients in search of gold, the quartz lying about in fragments, broken very small, in order to discover the traces of the precious metal.

The Gauls, on the first invasion of their country by the Romans, possessed enormous quantities of gold made up into torques and armlets. These were not the spoils of more civilised countries, for they appeared thus decorated on their first invasions of Italy and Greece—Virgil's Gauls scaling the Capitol, "lactea colla, auro innectuntur." Cæsar's conquest of that country so flooded Rome with gold, that, according to Suetonius, the pound weight was exchanged for only 3000 sesterces, or 750 denarii, or 1 : 8, the usual proportion being 1 : 13; but it must be remembered the Gallic native gold is of a somewhat low standard, holding copper as well as silver. Diodorus Siculus, a contemporary of Julius Cæsar, leaves no doubt upon the first point. His words (v. 27) are, "In Gaul silver is not found at all, but gold in plenty,[3] which nature supplies to the inhabitants without either mining or any trouble. For the course of their rivers, being full of sinuosities, and dashing against the banks of the

[3] The abundance of gold in the form of nuggets and flakes anciently procured by washings in regions now unproductive may be thus accounted for. All veins of gold lying in their original quartz matrix are richest at the top, and diminish in value as they run deeper until their entire extinction. The surface rock, readily disintegrated by the weather, suffers the rich lumps contained therein to fall amongst the débris and to be carried away by the rains, and thus we find pure masses of metal near strata now containing only threads and specks of gold, the former being the sole relics of the rich, superincumbent, stratum.

adjacent hills, breaks off vast mounds of earth, and fills their streams with gold-dust. This the people engaged in the trade collect, and grind and pound the clods containing the gold. Then removing what is earthy, by means of repeated washings, they commit the residue to the furnace for smelting. In this way they amass a quantity of gold, and use it up for ornaments, not merely for the women, but the men. For round their wrists and arms they wear bracelets, round their necks thick circles of solid gold, and finger-rings of marvellous size, and even golden breastplates. There is a peculiar and extraordinary custom prevailing amongst the Gauls in the interior with regard to the temples of their gods. In these sacred grounds and in the shrines there lies thrown upon the ground gold in abundance, dedicated to the deities, which, out of superstition, none of the natives dares to touch, although the Celts are naturally extremely covetous."

When the Consul Cæpio took Tolosa, the capital of the Tectosages (B.C. 112), he seized upon the treasure deposited in the temple of Minerva there, amounting to the vast sum of 15,000 talents (about 3,000,000*l.*). A large portion of this was the spoils of the Greek shrines, the offerings of the returning troops of Brennus, some two centuries before. This sacrilege brought so much evil upon Cæpio that "aurum Tolosanum" passed into a proverb for all ill-gotten gains attended with a curse.

The tradition of the riches of these Gallic temples has been of late singularly confirmed. A peasant (1832), digging for treasure in a ruined Druidical circle near Vieuxbourg, S. Quentin, was for once lucky enough to hit upon what he sought in the shape of a hoard of torcs. They were ten in number, with one bracelet, some very elegantly ornamented and of great weight, the heaviest being of 49 oz., the rest from 30 oz. upwards. The total value was about 1000*l.* They will be found accurately figured in the Archæologia for 1838.

The Gauls wherever they went seem to have possessed an instinctive faculty for discovering gold. Those settled in Upper Italy were as rich in the metal as their brethren beyond the Alps. When the consul Corn. Nasica triumphed over the Boii (B.C. 159) there were carried in the procession "upon the Gallic

waggons" no fewer than 1470 torcs and 250 pounds by weight of gold, besides silver vessels weighing 2340 pounds "made (in the national taste) with some degree of skill" (non infabre suo more facta); a singular notice on the part of the old annalist transcribed by Livy. But as those fertile plains had formerly been possessed by the Etruscans, those unrivalled goldsmiths of the ancient world, it may well be that the art yet lingered there under the savage conquerors, and this would explain the so frequent appearance of Græco-Asiatic patterns in Celtic ornamentation. It is evident the Celts imitated to the best of their ability the coinage of the Greeks: the same rule may be supposed to apply to their other works in metal.

This supply of gold lasted for many centuries. Procopius (Bell. Goth. iii. 33) records that the Frankish king Theodebert struck gold coin from the metal furnished by the mines of the country: an assumption of the imperial prerogative extremely galling to the pride of Justinian; Procopius remarking that even the Great King (of Persia) refrained, out of deference to the Romans! from issuing a gold currency with his own image upon it.

The sands of the Rhine below Basel are still washed every summer for gold-dust by the peasants of the grand-duchy of Baden, as are also those of the Aar below Bruhl. The return is but trifling at present, 5 francs' worth (little more than 1 dwt.) being the utmost obtained by each washer in a day's labour. Gold also exists in the quartz matrix in Switzerland. I have seen a small specimen extremely rich in fine filaments of the pure metal.

Astonishingly productive of gold was the soil around Aquileia, but it seems to have been quite exhausted before Pliny's times. These workings, Polybius says, were discovered in his own age. The gold was first met with at a depth of only two feet, and did not extend deeper than fifteen. The grains were as large as a bean, or a lupine; and so pure as only to lose one-eighth in the melting. Another kind required more smelting, but yielded amazing returns. At first the natives allowed Italians to work with them, but in two months after the discovery the price of gold throughout all Italy fell by one-third: whereupon

the Taurisci expelled all foreigners from the diggings, and monopolized them for themselves.

The gold ornaments, and coin struck in ruder imitation of the Gallic (themselves caricatures of Philip's staters), found so frequently in England and (as regards the personal ornaments more plentifully) in Ireland, were partly imported from Gaul into these holy regions, the centre point of the Druidical system,[4] and partly obtained from the stream-works of which traces exist in Cornwall, Devonshire (South Molton), the Carnarvon mines (recently reopened with some success, Vigra, &c.), the Lead Hills in Lanarkshire, the Wicklow districts, &c. Some of these localities were worked during the Middle Ages, and have ever since supplied mineralogical specimens of the ore to the explorer. The only metal exported from Britain in the time of Diodorus was tin, but gold is enumerated amongst its productions half a century later by Tacitus (Agricola, 12).

Greece Proper possessed no gold whatever as long as it was independent—the currency was exclusively of silver. The little gold they required for ornamental purposes they procured from Sardis. A tale is related by Theopompus (Ath. vi. 232), that the Lacedæmonians, requiring merely the small amount wanted for gilding the face of a bronze statue, sent all over Greece in vain in search of it, and at last in despair consulted the Delphic Oracle, which advised them to apply to Crœsus. On account of this primitive poverty "this temple was adorned with donaria in bronze—not statues, but caldrons and tripods made of bronze."

In the next generation Hiero, wishing to make a Victory and a tripod of fine gold for an offering there, after long search at home sent agents into Greece, who came to Corinth, and discovered at last that Architeles, a Corinthian, had accumulated a considerable amount by purchasing gold coin little by little through a long space of time. This person sold them the amount required, and then gave into the bargain his hand full of gold

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[4] "Britain cultivates magic enthusiastically, and with so many rites and ceremonies that one would think she had taught it to the Persians." (Comparing the Druids to the Magi.) Plin. xxx. 4.

pieces. In return for this liberality Hiero sent him back a shipload of corn and many other presents.

It is therefore to be concluded that at this time the Thasian mines were still in the hands of the Phœnicians,[5] who transmitted all their produce to Tyre. When, however, Philip had made himself master of the mines in Thrace, at Crenides and Scapte-Hyle, places under Mount Pangæus, that had belonged to the Thasians when Herodotus visited that island, he changed the name to Philippi, and prosecuted the works with great vigour and proportionate success, as appears from the extensive coinage of gold, which he was the first of the Greeks to put into circulation. These mines brought him in 1000 talents or 60,000 pounds weight of gold every year. They continued to be worked down to the end of the Macedonian kingdom. In the beginning of the reign of Perseus, Polybius notices that Abrobatis, a Thracian king, had got possession of them, but the Romans speedily expelled him. The first act of the latter on their conquest of Macedonia was to stop the works, only allowing the copper and the iron (Liv. xlv. 29). Inasmuch as this act is classed amongst their other favours to the vanquished, such as the grant of freedom, the reduction of the taxes to one-half, it would seem that the later kings had carried on their mining operations by means of forced labour.

To return to Philip: the metal for his coinage, besides the produce of these mines, doubtless represents much of those treasures of Delphi seen by Herodotus, but melted down by the tyrants Philomelus and his brothers to defray the expenses of the ten years' war they waged against the Amphictyons, whose general Philip was.

Diodorus (xvi. 56) states that Phayllus *coined* into money the 120 ingots presented by Crœsus, each ingot weighing two talents (120 lbs.), as well as 360 bowls of two minæ each (2 lbs.): also the woman and the lion in gold, weighing together thirty talents. All this gold amounted in value to 4000 talents of

[5] Pliny (vii. 56) records the ancient tradition that Cadmus, a Phœnician, first discovered gold-mines, and the art of smelting the ore, on Mount Pangæus, the locality in question.

silver (800,000*l.*), the whole of which went to pay his mercenary troops. The donaria in *silver* which they melted down amounted to 60,000 talents. When all was spent they set to work to dig up the floor of the temple in search of hidden treasure, but were made to desist by an earthquake. The sums thus sacrilegiously obtained equalled the whole of the Persian treasure afterwards captured by Alexander. By a more wanton sacrilege one gave his wife Erephyle's famous necklace, dedicated by Alcmæon; the other Helen's, the offering of Menelaus. The ladies drew lots for the choice: the proud and sulky one got the first, the beautiful and loose one Helen's (Ath. vi. 231).

As there exist no coins of these tyrants (or rather patriots), or even of the state, in gold (and of that enormous amount of the metal some, if minted, would certainly have escaped the recoinage of the victors), it follows necessarily that they put the treasure into circulation in the form of small ingots, ὀβελοὶ, that, as tradition tells, primitive style of Hellenic currency, or the earliest money of the Hindoos, bits of silver shaped like our dominoes, and having a punch-mark on one side only. We may be sure that Philip brought in a heavy bill of expenses to his employers, and that the bulk of the captured treasure found its way into his coffers.

His gold coinage must have been upon an enormous scale, considering the shortness of the period over which it extended, for even now his staters are as plentiful as those of his son, who had all the millions of the Persian darics to supply his mints. Similarly the gold pieces of Lysimachus, the next master of Thrace, are equally abundant, and testify to the continued productiveness of those mines. A recent visitor to that district informs me that the neighbourhood of Philippi is covered with vast mounds of refuse thrown up from the workings, which appeared to him much too recent to date from the times of the Macedonians: yet there cannot be found any record of the mines having been reopened by the Byzantines.

Of Athens the few genuine gold pieces known are evidently copied from those of Philip, and in all probability were issued when the city was in the hands of Archelaus, the lieutenant of Mithridates. There are also two or three small gold coins of a

very archaic type ascribed to Thebes, but their paucity and uncertain origin is such that their existence does not affect the question.

Philip's new gold coinage, the first that had appeared in Europe, obtained at once the most extensive circulation, owing to its purity and the vast convenience in trade of a representative of value universally received as perfect in standard and in weight. It is curious to find how even barbarous nations possessing gold, like the Gauls and some of the Illyrian chiefs, set about imitating these perfect works of the medallic art in rude pieces of their own.

After, however, the wealth of Persia and the tributes of the East had been made their own by the Macedonians, these Thracian mines fell into neglect. They had been worked so long that it is probable they were nearly exhausted before Thrace fell under the power of the Romans, who before that took place had taken from the Carthaginians the mines in the south of Spain, by far the most productive known to the ancient world. Of these, the mode of working them, and the reduction of the ore, Pliny has left the most exact details (xxxiii. 21), so interesting to the metallurgist as to deserve to be translated in full.

"Gold is procured in our quarter of the globe (we need not mention the Indian that is stolen from the ants, or the Scythian from the gryphons) in three different ways. As *gold-dust* from river-beds, as from the Tagus in Spain, the Po in Italy, the Hebrus in Thrace, the Pactolus in Asia, the Ganges in India; and no other sort is so pure, inasmuch as it has been thoroughly cleansed by the transit and the friction. In the *second* way, as dug up out of deep shafts in mines, or as picked up out of the fragments of undermined hills. Both methods must be described. Those who 'prospect' for gold, first of all take a 'Segutilum,' so the examination is called. This is a trough in which the sand is washed, and from what settles at the bottom a conjecture is formed. Occasionally by rare good luck the metal is found immediately on the surface, as lately in Dalmatia in Nero's reign, which produced as much as fifty pounds weight per day. When it is thus found in the very turf they call it 'Salutatium:'

and also if the earth below be impregnated with gold. The dry and barren hills of Spain, on which nothing at all grows, are forced by this internal treasure to be productive. That which is extracted out of the shafts is called 'Canalicium' or else 'Canaliense:' it is incorporated with lumps of a white stone, but not in the same way as it sparkles in the Lapis-lazuli, the Thebaic-stone, and in other gems, but in filaments embracing the particles of the quartz. These 'channels' of the veins run irregularly along the sides of the shafts, hence the name 'Canaliense.' The ground is kept up by wooden props. The ore got out is pounded, washed, roasted, then ground to dust. This powder the miners call 'Apitascudis,' the silver that is separated from it in the furnace they term its 'sweating.' The dross cast off by the fire, in all metals, has the name of Scoria. In gold-smelting this dross is again ground fine and melted. The crucibles are made out of 'Tasconium,' that is to say, of a white earth like pipe-clay, for no other would stand the fire, the blast, and the burning metal.

"The *third method* surpasses the fabled exploits of the giants. By driving adits to a vast distance they undermine the hills by the light of lamps. These lamps serve also to measure their spells of labour, and for many a month they do not see the light of day. This method they call 'Arrugiæ.' The ground overhead often cracks, gives way, and buries the miners, so that it would seem a less dangerous task to seek the purple dye and the pearl from the bowels of the deep: so much more dangerous have we ourselves made the earth! They leave arches at close intervals to support the superincumbent mass. In both methods of mining they come upon a flinty rock: this they break through by means of fire and vinegar; but more frequently, as that makes the mine too stifling by the smoke and heat, they cut through it with iron crows weighing a hundredweight and a half each, and carry off the fragments of rock upon their shoulders, by night and by day through the dark, and hand them over to those stationed next; the farthest of all see the daylight. If the hard rock seems too extensive, the miner follows its side and works round it; and yet mining in this hard rock is considered the easier of the two, for there is an earth made up of a kind of clay mixed with gravel

(which they call 'gangadias') that is almost impenetrable. This they attack with wedges of iron, and mallets of the same metal, and think nothing is so hard—were it not that the thirst for gold is of all things the very hardest. When the works are finished they cut through from below the supports of the arches. The coming fall gives warning, but that is only intelligible to the look-out stationed upon the top of the hill itself. He by shouting, by waving his hand, gives the signal to call out the miners, and at the same time flies down himself. The hill, crushed, falls in with a crash that cannot be conceived by human imagination, emitting a blast of wind of incredible violence. The successful miners view triumphantly the ruins of nature. Nevertheless the gold is not yet got, nor were they certain it existed there all the time they were excavating: a sufficient motive for all their risk and expense was the hope for what they desired.

"Now comes another task equal in difficulty, and of even greater expense. They conduct streams, in order to wash this wreck, along the mountain-ridges (an extra work), often from a distance of a hundred miles. This canal they call 'Conrugos,' probably a name derived from *conrivatio*. Here also there are a thousand labours to be encountered. The inclination of the level must be steep, so that the water may rush rather than flow; and therefore they conduct it from the highest parts. The intervening valleys and ravines are bridged over by a watercourse in masonry; in other places impassable rocks are excavated, and forced to yield a support for hollowed trunks of trees conveying the water. The workman, as he cuts, is suspended by a rope, so that to the distant view he presents the appearance not even of an animal, but merely of a bird on the wing. For the most part the engineer is suspended by a rope as he takes the levels and marks out the line for the canal; and where there is not even place for a man's foot to stand, rivers are led along by man's ingenuity. It spoils the washing if the stream bring any mud with it (that is a sort of earth which they call 'Urium'), for which reason they conduct the water over rocks and pebbles, and avoid the 'Urium.' At the ends of the fall upon the slope of the hills they excavate reservoirs 200 feet square, and 10 deep. In these, five outlets, usually 3 feet square, are left: so that when

the pond is filled, and the sluices are raised, the torrent rushes out with such force as to carry rocks away with it. Even now more work awaits them on the plain: trenches are cut for the stream to flow through, called 'Agogæ;' these are floored in steps with 'Ulex,' a plant like rosemary, but prickly, and fitted to retain the gold. The sides of these trenches are protected by planks, and the canals are carried on props over any chasms. So the rubbish, as it flows along, runs into the sea, and the fragments of the mountain are dissolved; and in this way Spain has extended her land far into the ocean by the earth washed down. The rubbish, drawn up with immense toil by the former method (sinking shafts), in order not to choke up the pits, is washed in this latter manner. The gold obtained by this process ('Arrugia') does not require smelting, but is found native. In this way lumps are found (as also in the pits) above 10 pounds in weight, which some call 'Palaga,' others 'Palacarna:' that which is small is called 'Balux.' The ulex itself is dried, then burnt, and the ashes washed, with a turf of grass laid under, so that the gold may deposit itself thereon.

"In this manner, according to some writers, 20,000 pounds weight of gold is annually obtained in Lusitania, Gallicia, and Asturia; Asturia supplying the largest proportion. In no other part of the world has the same productiveness lasted during so many centuries.[6]

"We have already mentioned that gold-mining in Italy is prohibited by an old-established decree of the Senate, else no country would have been more productive in this respect as well as in others. An ordinance of the Censors is extant, prohibiting the contractors from keeping above 5000 labourers employed in the gold-mines of Victumulæ, in the territory of Vercelli."

Mining was prohibited as injurious to agriculture (which the Senate endeavoured to promote in Italy by all the means in

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[6] This Spanish gold was not of a very high standard, for Pliny observes that all native gold contains silver, sometimes to the extent of $\frac{1}{3}$ the weight, sometimes $\frac{1}{10}$. But there was in Callæcia one mine, the Albucratense, that produced the best of all, having but $\frac{1}{36}$ alloy. This last is certainly of unusual purity, for *now* the Californian has often more than $\frac{1}{12}$ of silver, and even the finest Australian (Bendigo) never less than $\frac{1}{24}$.

their power), because it absorbed the labour that otherwise would have been employed upon the land. This prohibition extended to all mines alike. Even the very productive copper-mines in Tuscany were not worked when Pliny wrote.[7]

After the introduction of gold as the most important currency, by Philip, the art of refining it was brought to extraordinary perfection. This was maintained for an astonishing length of time, considering the difficulty of the operation, and the vast temptation to needy princes to tamper with the standard. An aureus of Vespasian, when assayed, was found to contain only $\frac{1}{78}$ of alloy; others about $\frac{1}{60}$: a native mixture which the most careful modern process could hardly extract. Even the wretched Byzantine emperors long resisted the temptation of debasing their aurei, and were satisfied at first with but a slight depreciation of the standard. The bezants of the Comneni, in the 11th century, are still of 22 carats, that is, hold $\frac{1}{12}$ alloy, the proportion allowed in the English sovereign, now the highest standard issued in Europe.

But after their recovery of Constantinople from the Franks (1261), the Palæologi debased the standard to a degree never attempted, either before or since. Michael, the restorer of the Greek Empire, had previously, whilst reigning at Nicæa, minted bezants of only 16 carats, or two-thirds, fine gold; but his son Andronicus was so beggared, says Pachymer (vi. 8), by the enormous subsidies he had to pay to the Latins (his Genoese allies), that he reduced even this miserable quality to 10, and ultimately to 8 carats fine, so that the alloy actually equalled twice the weight of the gold: hence his bezants have now the appearance of mere brass gilt.

The Venetians, amongst the first in mediæval Europe to coin gold (their famous *zecchino* commencing in the year 1280), though they copied exactly the type of the contemporary bezant, the Saint presenting the *gonfanon* of sovereignty to the kneeling Doge, yet restored its standard to the utmost purity. So did the Florentines in their equally famous *fiorino d'oro*, issued a few years earlier (1252), taking its title from the fleur-de-lys, rebus of the city's

[7] Nor the gold-mines of Aquileia.

name, on the reverse; the type of the obverse being their patron the Baptist; the coin, "la lega suggellata dal Battista." The great Italian cities were to the last honourably jealous about the purity of their gold coinage. Dante finds Maestro Adamo plunged very low in the realms of torment for having forged florins containing merely 3 carats of alloy (the present French standard nearly), at the instigation of the Counts of Romena, who thus made a profit of 12½ per cent. by the falsification. (Inf. xxx.)

> "Ei m' indussero a batter i fiorini
> Che avevan tre carati di mondiglia."

Our present standard, though *now* the highest used in Europe (on which account the Italian goldsmiths eagerly buy up our sovereigns to melt for their filigree-work, often at a higher rate than the course of exchange), dates strangely enough from the first attempt of Henry VIII. to tamper with the gold coinage; and this not before his 36th year, when he ventured to add 2 carats of alloy to the standard, ever before pure—a great national boast. Even *his* audacity advanced no further than the addition of 2 carats more in his last year, that time of bankruptcy. This last standard of 20 carats was used for the first mintage of his son; but in his second he restored the *fine* for his sovereigns and angels, but retained that of 22 for all his other pieces—a rule never subsequently altered. The sovereign (or 30-shilling piece) continued of fine gold until its extinction under James I., as did the angel down to its last appearance in the reign of his unfortunate successor.

No European nation can at present boast of a coinage in *fine* gold, though down to the close of the last century such was largely minted in the Venetian and Papal zecchins, and the Dutch and Austrian ducats. The credit of maintaining to the last this ancient glory of the mint most fittingly rests with Florence, and with its late worthy and much-to-be-pitied Grand Duke Leopoldo, whose *ruspone* (20-dollar piece), a magnificent coin, equalling in beauty of execution its intrinsic purity, was issued, though sparingly, within my own recollection. For the new-stamped "Kingdom of Italy," the French standard of one-tenth alloy (for both metals) has been adopted; and the same

appears to be now uniformly employed in all the mints of the Continent, and likewise of America.

The *refining* and *assaying* of gold form the natural sequence to this notice of the "standard of purity." We have already seen from Agatharcides' details how the old Egyptians refined the gold they obtained by quartz-crushing. This process, however, would only separate the baser metals, not the *silver* of the native alloy. How the Greeks and Romans subsequently contrived to obtain it so absolutely pure, still remains a problem. Unfortunately our grand authority Pliny fails us here, giving only a few incidental hints. Speaking of *misy* (crude arsenic), he alludes to its use in this process: "hoc admiscent qui aurum purgant." Arsenic still enters into the composition of gold-solder to make it more fusible. In another place he notes that gold was refined by melting it along with lead. Again (xxxiii. 22), he mentions the common employment of quicksilver for the same object, as the most effectual means, the pounded ore being immersed in the fluid, and shaken for a long time in an earthen pot, by which means "the gold was forced to vomit up all its impurities." To separate the quicksilver, the amalgam was put in a leather bag, when by pressure the former oozed through the pores of the leather, leaving the gold behind *pure*. But, in fact, this amalgamation would not extract the silver. This is now effected by *quartation*, an operation taking its name from the addition of sufficient *silver* to the mass to constitute three-quarters of the weight. The mixed metal being immersed in nitric acid, the silver is attacked and dissolved into powder, the gold remaining intact in the form of a spongy mass. Mentioning its extreme infusibility, he adds that the best material for melting gold (which resisted the hottest charcoal-fire) was *paleæ*, or straw that has been threshed—a strange fact, if correct, which he again adduces in his notice of the best materials for smelting the various metals (xxxiii. 30).

The *assaying* of gold was called *obrussa* or *obryza*, the etymology of which has been much disputed: although in all likelihood it is a Spanish or Punic word, like all the rest connected with gold-mining, and already quoted. In our own language an analogy presents itself in the same department; our mining terms

come from the Germans brought over to instruct our people in such operations; hence such technical terms as "sumf," "brattice," "ingot," &c.

Obryza, from the "test," came to imply the standard itself; hence in the Byzantine Code (see Leo's Basileia, *passim*) ὄβρυζα is employed to designate the current aurei of the times, much in the same way as the word "sterling" at present.

This test or assay consisted merely in making the gold, whose quality was to be ascertained, red-hot in the fire, when, if the colour remained unchanged, its freedom from all alloy was established. For with the least admixture of copper, its colour was thus destroyed: our sovereign, though of such high quality, thus treated, becoming coated with a reddish-brown oxide of the baser metal. Some suppose this red-heating gave the name to the test: a derivation perhaps supported by Pliny's expressions: "Auri experimentum ignis est ut simili colore *rubeat* ignescatque, et ipsum *obrussam* vocant: primum autem bonitatis argumentum quam difficillime accendi." The last word, like "ignescere," signifies melting; for fusing at so high a temperature a lambent flame plays upon the surface of the liquified metal. To this test Martial alludes, where, praising the fine quality of his golden *phiala*, he says (viii. 51),

"nec odit
Exploratores luridâ massa focos."

Hence "gold tried in the fire" is synonymous with "pure;" and the Byzantines called their aurei (even after they had lost all claim to the title) ὑπέρπυροι, "superior to the fire;" out of which word the Latins made the curious "perperi" their common name for the bezants.

From this assay the gold coins of the Lower Empire, after Constantine's reform of the currency, for many ages downwards, are marked in the exergue COM.OB, to indicate that their standard is the *obryza*, or fine gold, which was indeed the truth for six centuries after Constantine. The letters COM have not been satisfactorily explained: the final OB, however, admits of no doubt as to its purport, although a recent numismatic writer prefers construing them as the Greek numerals for 72, the actual

number of the aurei to the pound Roman. But the use of Greek numerals in legends entirely Latin seems to me contrary to all analogy.

The Romans had many *alloys* of gold, but all designated by distinct appellations, their "aurum" always standing for the refined metal. Thus gold containing as much as ¼ silver took the name of Electrum. Some was found native in the Spanish gold-washings, some was an artificial alloy. It was in request for drinking-vessels, partly because it was more lustrous by lamp-light than the unalloyed metal, partly because the native kind was supposed to betray the presence of poison in the draught it contained by a changing colour and crackling noise. The Pyropus was made by adding 6 scruples of gold (or one quarter) to the ounce of copper: this was beaten out into a leaf, apparently to be used for foiling gems; and seems to have been what is elsewhere described as Aurichalcum so employed. This alloy would produce a very red foil, which by the application of heat can be made to take various and singular colours.

Pliny notices the great ductility of gold, allowing a single ounce to be beaten out into 750 leaves, each 4 digits (3 inches) square, and even thinner. The thickest sort was called the Prænestine in consequence of having been employed for gilding the famous statue of Fortuna in that city: the second quality, the Quæstorian. It was also drawn into wire and woven into cloth entirely by itself. In a robe of such texture had Pliny seen the Empress Agrippina, enthroned at the side of Claudius, at the show of the grand Naval Fight on the opening of the emissary of the Fucine Lake. Some notion of the weight thus borne by the person distinguished by such a robe may be deduced from what Fauno (Ant. di Roma) tells of the vestments found (1544) in the sarcophagus of Maria Honorii (a child but six years old at the time of her decease): these robes of silk and gold thread yielded when melted down 40 lbs. weight of the finest gold.

Pliny gives recipes for the *solder* used by the goldsmiths of his time (xxxiii. 29). The chief ingredient was Chrysocolla, or native verdigris; this was pounded in a copper mortar with a copper pestle, mixed with nitre and a child's urine: this served for gold containing an alloy of silver. It was called *Santerna*,

another term of Punic origin. For gold alloyed with copper, a seventh part of gold and silver was ground up with the composition. Theophrastus also speaks of the Chrysocolla being used as a solder, but gives no further particulars as to the mode in which it was applied.

The Roman gilder stuck the leaf-gold upon marble by means of the white of egg; for wood he had a size, "Leucophorum," made of Sinope earth, Sil, and Melinum, mixed together and suffered to ferment for twelve days. This was applied as a *glue*, and therefore dissolved in boiling water.

In gilding copper, quicksilver was made use of, as at present; the surface being rubbed with it, the leaf-gold was applied, and the quicksilver then driven off by the application of heat. If the leaf was single, or too thin, the surface looked pale, for which reason the workman, with a view to his profit, substituted for it the white of egg, which doubtless stood the air very satisfactorily for a certain time, at all events sufficiently long to secure his payment. Pliny complains that mercury was then only used in gilding silver: for bronze-work a cheap and fraudulent substitute had been universally adopted, the particulars of which however are to me unintelligible: the bronze was made red hot, then plunged in a pickle of salt, vinegar, and alum. It was now polished with sand, when its lustre proved if it were sufficiently purified. In this case it was slightly heated, and thus "tamed down" so as to receive the gold-leaf, which was fixed on it by means of a mixture of pumice, alum,[8] and quicksilver. Perhaps the object was to save the quicksilver, evidently an expensive article at that time.

Strangely enough, Pliny distinguishes the Argentum Vivum, the native quicksilver found liquid and pure in the mines of other metals, from the Hydrargyrum, extracted by sublimation from the Minium, its sulphuret: although the metal is precisely the same in both cases. The greater rarity of Mercury in its native form must have given rise to this notion as to its superior quality. The Romans obtained it from the Spanish silver-mines:

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[8] He notes here that alum serves as well as lead in the refining of gold.

and still Almaden is one of the two chief sources, Idria in Carniola being the other.

Idols made entirely of gold seem to have been peculiar to Oriental nations. Herodotus,[9] and after him Diodorus, have left accounts of such in Babylon of a weight evidently vastly exaggerated by tradition, for the iconoclast Persians had melted them down, even before the former historian visited Babylon. The famous statue of Anaitis (Venus), made of solid gold, remained in her temple at Anaitica on the Euphrates until it was plundered by Antony's soldiers on his Parthian expedition. Augustus, dining with an old soldier of Antony's at Bologna, inquired if it were true that the first plunderer who laid hands on the idol was immediately struck dead, and received for answer that his host was the very man in question; that Augustus was then dining out of a leg of the goddess (converted into a dish); and that his whole fortune consisted in that piece of plunder. The large Chryselephantine statues of the Grecian sculptors required a comparatively small weight of the metal. Pausanias notices that the trunk of these figures was made up with plaster and clay. Gorgias the Rhetorician dedicated a solid figure of himself at Delphi, but it was doubtless a very small statuette, seeing the rarity of the metal in Greece at that time, the 70th Olympiad. Works of the same nature and of immense intrinsic value continued to be made for dedication in temples under the Roman Empire: thus we find Priscilla the wife of Abascantius (and he merely an Agens in rebus) directing by her testament to offer in the Capitol a portrait of Domitian to weigh one hundred pounds of gold.

> "Da Capitolinis æternum sedibus aurum
> Quo niteat sacri centeno pondere vultus
> Cæsaris et propriæ signet cultricis amorem."—
>
> Stat. v. i. 190.

[9] He actually saw in a shrine at the base of the Temple of Belus the seated figure of the god, which, with table, throne, and footstool, the Chaldeans informed him, weighed 800 talents (48,000 lbs.). The statue carried off by Xerxes was that of a *man* (ἀνδριας), 2 cubits high, and *solid*. This must have been the statue of the founder of the temple: its solidity however is evidently a fiction of the guides. These vast figures, as the account of the Jewish Sanctuary proves, were first carved out in cedar-wood, and then overlaid with gold in plates necessarily slight to admit of being moulded over the carving underneath.

This must have been a votive clipeus, embossed with the bust in high relief. If a subordinate dedicated pieces of this magnitude, some notion may be formed of the magnitude of similar gifts from imperial and noble devotees.

The rare Greek reliefs and figures that have come down to us in this metal are of thin plate, beaten out in the manner now termed Repoussé, and originally filled up with mastic for the sake of giving the work stability. When Philip first became owner of a golden cup he set so high a value upon it as always to keep it under his pillow, a sufficient proof of the extreme rarity of such articles in Greece before the conquest of Persia.

The anecdote concerning Antony's veteran recalls the fact that at a later period of the empire the luxury of the Romans exhibited itself in the vast size of their golden dishes. Thus, in the 5th century, Aëtius presented a "missorium," weighing 500 lbs., of exquisite workmanship, enriched with precious stones, to Torismond, King of the Goths.[1] The King of the Burgundians, Gontron, tells the assembled Gallican bishops, showing them a large gold basin, that, having captured the plate of the Roman Prefect Mummolus, he had only retained for himself one dish 150 lbs. in weight, with this basin, and had ordered fifteen others exactly like it to be broken up, having no use for them himself.[2]—(*Gregory of Tours.*)

Another mode in which vast quantities of gold were used up in Roman times, in imitation of the Persian fashion, was in the χρυσόπατα, or robes covered with disks in thin plate, adorned with designs *en repoussé*. Of these embossed dishes many are yet in existence. The substance of the gold plate is the thickness usually of stout cartridge paper; hence the weight that went to the embellishment of a single robe was very consider-

[1] In 631 Sisinand, an aspirant to the Spanish throne, purchased Dagobert's alliance by the promise of the Missorium, which he redeemed by 200,000 aurei (an inadequate sum), expended by Dagobert in founding St. Denys. At the nuptials of Adolphus and Placidia, celebrated in the palace of Ingenuus, at Narbonne, the wedding-gift consisted of 50 beautiful youths in silken robes, bearing on each hand a gold basin, one filled with aurei, the other with precious stones of inestimable value.

[2] Quoted by Ferd. Seré in his 'Orfèvrerie-Joaillerie,' à propos of the Merovingian chalice and square lanx found (1848) at Gourdon.

able. In the imperial robes, as figured on the bezants, each disk appears as the centre of a square compartment in pearls, all sewn upon the stout purple silk. Like the Hindoos, the ancients, especially the earlier races, were wonderfully skilful in working in wire, filigree, and *repoussé* articles. (See *Cœlatura.*)

Gold was esteemed a powerful amulet: thus infants and wounds were touched with it to prevent any spells from affecting them. Nevertheless, if it were held over fowls or sheep, it stopped their breeding, unless it were dipped in water, and the animals sprinkled therewith. Roasted in a pot with salt and vitriol, and a second time with salt and schistos (alum), it communicated (though unchanged itself) a particular virtue to the dust, which rendered it a sovereign application for bad ulcers and for piles.

THE ROMAN STANDARD OF CURRENCY.

Pliny expresses his surprise that the Republic had exacted the tribute from all the subject nations in silver instead of in gold, as was the rule in his times. He did not pay attention to the fact that under the Republic the standard of currency was silver, and that all payments were estimated in that medium. There had indeed been a coinage of gold, commencing about 200 B.C., but to a very limited extent, and apparently not so much intended for commercial as for religious purposes, for distribution in prizes, or as offerings to certain deities under specified conditions. These coins were extremely minute, weighing 20 Roman grains (18 Troy), and current for 20 sestertii, the value XX being marked on the obverse. Doubles and Trebles of these are also extant, but the whole series ranks amongst the rarest of the rare. In fact, the republican gold currency was almost as limited in extent as that of Athens. But in the last half-century of the Republic it was considerably augmented, Julius Cæsar, and the heads of the opposite party (more particularly in the Civil Wars following his death), coining pretty largely gold didrachms of the weight of the gold Philippus, then the universal currency of the civilised world. But under the Empire the whole monetary system was changed: gold became the standard, a matter of neces-

sity in a condition of wealth (as it had been before in the Persian Empire); silver was only issued to the amount required for necessary small change, and by some of the first Cæsars hardly at all, *e. gr.*, in the reigns between Tiberius and Vespasian. Of some of these emperors, as Claudius and Nero, more gold pieces than silver are actually now extant. Under the latter the issue of gold and bronze beautiful pieces was enormous, but his denarii are most carelessly made and rare; of Claudius probably no genuine silver exists; all now seen in cabinets are plated and due to ancient forgers.

Hence, gold being now the standard, the taxes were all estimated in that metal, every *caput* being assessed at so many aurei. Of this certain tyrants took advantage, like Elagabalus, who, coining aurei of ten or more in weight, even up to 100 (bilibres), exacted the same *number* of aurei as before from the payer, whilst he decupled or centupled the actual amount. Sev. Alexander, acting upon the same principle, retained the nominal amount of the assessment, whilst he reduced the real burthen upon the taxpayer by striking thirds of the aureus; and intending, if possible, to issue quarters (a thing found impracticable), thus making the *caput*, who had in the previous reign paid in one aureus the value of ten, by this singular expedient for lowering the tax, now pay but $\frac{1}{3}\frac{1}{0}$th of that amount. To obviate similar injustice it was afterwards specified in the ordinances that the payment was to be made in aurei of so many to the ounce,[3] which, when Julian was Cæsar in Gaul, Ammian mentions incidentally were six to the ounce, the regular weight of the aureus after Constantine's regulation of the mint, and of the succeeding Bezant, down to the end of the Empire. Yet long after Julian's time the publicani had revived the old method of extorting more than their due from the unfortunate provincials, for Majorian in an edict reprobates their exacting payment in the gold of the Antonines, thereby raising the tax nearly 50 per cent., for this coinage was to that of the Lower Empire as 110 to 72, and

[3] There are bronze weights extant of the reign of Arcadius and Honorius, inscribed EXAGIVM SOLIDI, *i.e.* the legal weight of the *gold* coin as it was to be received by the taxgatherer.

orders that no aureus, if of full weight, should be refused in payment of the tribute.

That from the beginning of the Imperial régime the taxes had been paid in gold, and no longer in silver, appears from the anecdote told by Suetonius of Caligula, that, wishing to view the tangible income of the state, he caused all the *tributa* of the year to be poured on the ground in one room, and, stripping himself, he wallowed "super immensos aureorum acervos," and literally bathed in gold; a freak befitting an imperial lunatic, and a fancy full of a certain insane magnificence. From this time too we find all the legal fines estimated in aurei, at first simply named as such; but when pieces of different weight came to be in circulation together, the assessments are made in ounces or pounds of gold. The ancient method of reckoning by *Sestertia* was retained by the historians, who affected the antiquated mode of expression, and perhaps to a certain extent in ordinary life, for it happened to be convenient enough, a Sestertium being exactly ten aurei. In fact, this old way of reckoning had now a more tangible representative in the currency than before, for the Sestertius, the unit, was issued in abundance, being what numismatists call the First Brass, whereas, under the Republic, it may be said to have been but a money of account, the few sestertii coined in silver being rare to an excess. Even this custom expired in the interval between Suetonius and the Scriptores Hist. Aug., for, in their reckonings of sums, the aurei, "Philippi," are counted by tale. But theorists unacquainted with this fact attempt by long and intricate calculations to give the value of the aureus in the terms of the silver standard, long before become obsolete. The sole true method is to compare the weight of the aureus with that (intrinsic) of the modern gold, and it will be found that for the times down to Severus the former was equivalent to our sovereign.

BASALTES: *Basanites: Basalt.*

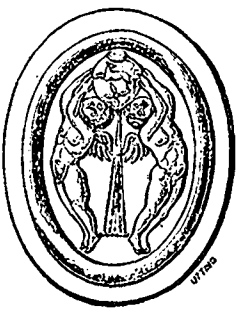
An igneous rock, extremely fine-grained, of a deep black, but showing a slight tinge of green when viewed at a certain angle. The Romans got it from Egypt, and its name (Coptic) implied that it had both the appearance and the hardness of iron (xxxvi. 11). Indeed sculptures in Basalt have greatly the appearance of cast-iron figures. The surface, however highly polished, exhibits a granular texture, serving to distinguish it from the valuable antique black marble, the "Nero antico."

The largest work in Basalt known to the Romans was the recumbent Nile, with his sixteen infants sporting about him—alluding to the number of cubits attained by his annual rise. This had been dedicated in the Temple of Peace by Vespasian, and is now in the Capitoline Museum. It is apparently a work of the age of the Ptolemies, and brought from Alexandria by the Emperor named as the dedicator. Pliny mentions a report that there existed at Thebes a similar statue, but of Serapis. The Capitoline Museum also possesses some wonderful Centaurs and Stags in Basalt, ascribed to the reign of Hadrian. His love for Egyptian art had revived the use of this stone, in which some extraordinary monuments of the earliest times were executed, such as the sarcophagus in the British Museum commonly known as the Tomb of Alexander.

The more compact pieces of this extremely hard material were used for scarabs and intagli by the later Egyptians. It is not unusual to find Gnostic amulets, belonging to the Alexandrian sects, engraved in Basalt. Engravers, however, of a good period, have never made use of so coarse a material. The only black stone ever presenting intagli of artistic value is the Black Jasper, and even that was but in small request with the Romans.

It is unaccountable why the Romans should have considered the Basalt as an exclusively Ethiopian production, when precisely the same rock was being quarried a few miles off in the Campagna (near Baccano), in vast quantities, to pave their roads, the "silex" of the Via Appia being a true Basalt. Perhaps, however, these suburban quarries did not supply masses of sufficient dimensions to be worked into statues; and it is still more likely that all the sculptures in Basalt known to the Romans had been executed in Egypt, which would to a certain extent have prevented their discovering what really was the material.

Basalt more probably took its name from its resemblance in colour to the *black* pebble used by the Greeks for testing coin upon, which appears to have been the same substance and similarly used as our Touchstone. The French "basané," swarthy, seems to have the same origin. This βασανὸς is largely dwelt upon by Theophrastus (45-49). These were only found in the river Tmolus, were round and flat like a counter (ψῆφος), but twice as large as the largest counter; and their upper side, that had lain exposed to the sun, was better for the *touch* than the lower, whence a moisture was apt to exude. By means of this stone the exact amount of alloy, either copper or silver, in the standard of the gold stater could be exactly discovered. (*See* Lapis Lydius.)



BATRACHITES: *Toadstone.*

THE brief notice of this stone by Pliny is: "Coptos also produces the Batrachites, one sort like a frog in colour, another ebony, the third of red mixed with black." Small figures of frogs perforated to be worn as amulets, and in the later Egyptian style, occasionally are to be met with cut in full relief out of a yellow and green Jasper, reproducing with singular exactness the actual colours of the reptile, and which, therefore, has some claim to be pronounced the ancient Batrachites. No further notice of this stone can be traced in the other writers of antiquity.

But this singular epithet, primarily designed only to denote the peculiar colour of the stone, furnished later times with the foundation for a most marvellous fable, which long obtained, as the number of examples still preserved attest, universal credit throughout Europe. Understanding the ancient term as implying the natural production of the animal according to the analogy of other similar names, as the Saurites, Echites, &c., doctors taught that the "toad, ugly and venomous, wears yet a precious jewel in his head." A full account of this will be found in that repertory of mediæval lore the 'Speculum Lapidum' of Camillo Leonardo, written towards the close of the 15th century. He describes it by the name of Borax, Nosa, and Crapondinus, and as being found in the brain of a newly-killed toad. There are two kinds, the white which is the best, and the dark with a bluish tinge with the figure of an eye upon it.[1] If swallowed it was a certain antidote against poison, in its passage through the bowels driving out all noxious matters before it. More than

[1] The brown marks, seemingly produced by oxide of iron, observable on some of these fossils.

a century later Vossius asserts (De Phys. Christ. vi. 19) that it was usual to take the Bufonites (Toadstone) in drink before meals, to counteract any poison that might be administered in the dishes; a singular dinner-pill, exemplifying the state of society in those times. It was also believed to burn the skin, at the very presence of poison, if worn set open in a ring so that the stone should touch the finger; besides which, it was also good against all complaints of the stomach and kidneys if so worn. Chinese porcelain also in the times of Vossius was supposed to fly into pieces when a poisoned draught was poured into it. Erasmus, in his 'Peregrinatio Religionis ergo,' thus describes a famous Toadstone set at the feet of Our Ladye of Walsingham:—"At the feet of the Virgin is placed a gem to which no name has yet been given among the Greeks or Romans, but the French have named it after the toad, inasmuch as it represents the figure of a toad so exactly that no art of man could do as well. And the wonder is so much the greater, that the stone is very small, the figure of the toad does not project from the surface, but shines through as if enclosed in the gem itself. And some, no mean authorities, add that, if the stone be put into vinegar, the toad will swim therein and move its legs." This account makes it probable that the gem in question was a lump of amber enclosing some large insect.

Another version was that in order to preserve its virtues this jewel must be voluntarily surrendered by the living reptile. De Boot relates how that in his boyhood he had sat up a whole night watching a toad placed upon a red cloth (the received mode of making it disgorge the treasure), in the hopes of seeing it cast up the Bufonites; but the experiment failing, he concludes the story to have no foundation in fact. The figures he gives of the substance resemble greatly in shape the small fossil spheres, like strawberries, found in the gravel. It is probable enough that the toad, like certain larger reptiles (the alligator), may be in the habit of swallowing small stones to assist digestion, and such, if found by accident within an animal enjoying so great a reputation in the Middle Ages for his powers both for good and evil in medicine, would naturally be taken for a most potent gem.

Many Toadstones are still preserved in collections of antique jewels, set in silver rings, the metal appropriated seemingly to that purpose, being generally prescribed for the setting of all amulets. I have lately had an opportunity of examining several of these toadstones, some in their original settings, some extracted. They are hemispherical, or sometimes oval, hollow within, of an apparently petrified bony substance, whity brown, or variegated with darker shades. The most probable explanation of their origin is, that they were the bony embossed plates lining the palate, and serving instead of teeth to a fossil fish, an arrangement observable in the recent representatives of the same species.[2]

Pliny indeed includes in his alphabetical list (though with frequent sneers at the credulity or roguery[3] of his authorities) numerous "stones of virtue" found inside various animals, viz., the Alectorias, like a crystal, as big as a bean, found in the belly of a cock, by the virtue of which they pretend that Milo of Crotona gained his reputation for being invincible. Mediæval naturalists added that this stone prevented the wearer from ever feeling thirst, and that the cock containing it was betrayed by his never drinking with his food like other fowls. There is no doubt that crystalline stones are often found in a fowl's gizzard, as they pick up anything shining in preference, for which reason in Brazil their gizzards sometimes contain diamonds.

The Brontias, from the tortoise's brain, extinguished fires occasioned by lightning.

The Cinædia, found in the brains of the fish so called, of a white colour and oblong shape, foreshowed tempests by a change of colour, being clear in fine, but cloudy in stormy weather.

The Chelidonia was of two kinds, in colour like the swallow, on the one side entirely purple, on the other purple dappled with black spots. But Isidorus, improving upon this simple state-

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[2] I have at last had the satisfaction of establishing this by the inspection of a part of such a palate from the Greensand formation, still thickly studded with many such bosses, some the identical hemispheres in size and nature to be seen set in rings, and so diminishing into others no larger than a mustard-seed.

[3] "Magorum mendaciis."

ment, which derives the name merely from the colour, makes these stones to be found *within* the swallow, of two kinds, white and red, of wonderful virtue in the cure of insanity and in giving good fortune to the wearer.

The Chelonia, or Indian tortoise's eye, smeared with honey and laid on the tongue, bestowed the power of divination for periods varying according to the moon's age.

The Chelonitis resembled in shape the tortoise; the Magi told wonderful stories of its power in appeasing storms; nevertheless the kind starred over with gold spots, if thrown, together with a beetle, into boiling water, would raise a tempest.

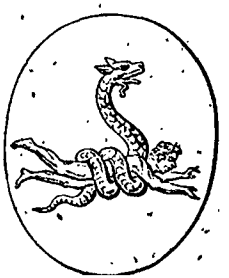
The Chloritis, of a grass-green, was to be found inside the wagtail; this the Magi recommended should be mounted in an iron ring "to produce some of those prodigious effects they are wont to promise." The Draconitis or Dracontias, from the serpent's brain, had no lustre unless cut out of the living reptile. Sotacus, who had himself seen it, says it was colourless and transparent, could not be polished, or admit of any artificial improvement. In this quotation from Sotacus (elsewhere styled by Pliny "e vetustissimis auctoribus") we find the first allusion to the real Diamond, and the popular Indian tale of the Valley of Serpents that alone produced it. Sotacus adds that the hunters went in quest of it in chariots, and when pursued by the serpent fled, strewing the ground in their flight with some soporific drugs by which the reptile was overpowered, whereupon they returned and made prize of his head.

Philostratus, however, gives fuller details of the mode of capture (iii. 8). "These dragons are thus taken: having woven letters of gold into a scarlet robe, they spread it out before the den, but first of all magically infuse a soporific power into these letters, whereby the dragon hath his eyes overcome, losing all power to turn them away. They also sing over him many spells of their mystic art, whereby he is drawn forth, and, putting his neck outside of his den, falls asleep upon the letters. Then the Indians, assailing him as he lies, cut off his head with their axes and make prize of the gems within it, for in the heads of these mountain-dragons are secreted gems bright-coloured to the

eye, and reflecting all kinds of hues, of virtue moreover indescribable, like the ring of Gyges. Often too doth the dragon seize the Indian, axe, charm, and all, and escape with him into his hole, all but making the mountain tremble."

The Hyænia, existing within the eye of that beast, which was hunted in order to procure it, placed under the tongue conferred the gift of prophecy; and lastly, the Saurites was to be procured out of the belly of a lizard cut open with a knife made of a sharp reed.

Pliny concludes his alphabetical list with this not uncalled-for observation: "There are many stones besides these, and of an even more prodigious description, to which writers have given foreign names, allowing them to be minerals (lapides), and not gems; it will be enough for us to have, in the foregoing list, exposed a few of their awful lies" (dira mendacia).



BERYLLUS: Βήρυλλος: *The Beryl.*

Pliny notices (xxxvii. 22) that many were of opinion that this stone was of the same or a similar nature with the Emerald. This opinion has been proved correct by modern analysis, the component parts of each, in the same proportions, being Silica, Alumina, and Glucina, coloured by the oxide of Chrome. Hence Phillips (Mineralogy: Beryl) states that "the only important difference between Emerald and Beryl is their colours; which, since they present an uninterrupted series, is altogether insufficient for a division of the present species." The Emerald is distinguished by its peculiar "emerald-green," which it derives from a small proportion of Chrome: all the varieties of other colours, tinged more or less yellow, or blue, or altogether colourless, are Beryls. Yet, though thus identical in their chemical constitution, the Beryl is by far the harder of the two, its hardness being denoted in the scale by 7·5 to 8, and therefore even superior to that of the Garnet. It appears also to be of a singularly compact texture, for antique intagli in Beryl are found retaining their original surface-polish more perfectly than those in almost any other material. Not so the Emerald.

This gem held the same degree of rarity amongst the Romans as the true Smaragdus itself, for it was then obtained from India almost exclusively, "being rarely found elsewhere." (Plin.). Dionysius Periegetes enumerates it amongst the gems gleaned by the Indians from amongst the pebbles of their torrents, and as embedded in serpentine rock in Babylonia. Pliny distinguishes its varieties with all the accuracy of a modern mineralogist. The most admired, says he, emulate the green tint of pure sea-water (the modern Aquamarine). Next in favour is the Chrysoberyl, in which this green is tinged with a golden lustre (this probably is our Indian Chrysolite). There was a still paler

kind known then by the name of Chrysoprase, but in fact only a variety of the last mentioned. Then came the Hyacinthizontes, or sapphire-like sort; and the Aëroides, of a yet fainter shade of sky-blue.[1] This was the species invariably employed for intagli by the ancient engravers, as all existing antique examples attest. Lowest of all were ranked the wax-coloured, and the oily, *i. e.* those of a greasy yellowish green, or such as were totally colourless.

The Beryl was the only one amongst the precious stones that was facetted by the Roman jewellers, who cut it into a sexangular pyramid, as otherwise it had no brilliancy. Beryls were then highly prized both for the purpose of ear-drops and of mere ornamental, *i.e.* not engraved, ring-stones. When Cynthia's shade appears to Propertius he remarks that (iv. 7)—

"Et solitam digito beryllon adederat ignis."

And Juvenal's ostentatious host Virro drinks from a bowl embossed with Amber reliefs and Beryl—

"Heliadum crustas et inæquales beryllo
Virro tenet phialas."

Inasmuch as their chief value consisted in their length, the Romans, according to Pliny, preferred to make "Cylindri" or pendants out of them rather than ring-stones. Such were the costly presents which, as Juvenal hints (ii. 61), would reward the bride for her discreet silence—

"Tu nube atque tace, donant arcana cylindros."

The Indians cut this stone similarly into long cylindrical beads, and wore them strung upon elephant's hair, believing that their lustre was heightened by this perforation and the removal of the internal substance, or "paler marrow." But the most perfect in colour were not bored, but used for decoration by having each end secured within a gold boss.

[1] St. Laurent thinks this was the true sapphire, and Lessing agrees with him (Ant. Briefe, xxvi.), asserting that the ancients knew the sapphire only as a sort of amethyst, or of beryl. But this is an error, for the blue beryl, though much resembling the other, differs totally from it in hardness, lustre, &c.

This nation had also the art of tinging the common Rock crystal so as to pass it off for the Beryl: probably by plunging it when heated into some menstruum saturated with oxide of copper; as the *Rubace* of the French is still produced by thus treating a piece of crystal in a spirituous solution of cochineal. Even now the Indians paint the back of every coloured gem they set, so as to improve the fainter tints; for which reason they never mount them in their jewelry without a backing. From this deceptive practice of adding a fictitious beauty to their gems, those in native Indian ornaments are rarely, when taken out, found to be of much value: all of high intrinsic worth are sold for the European market, the inferior samples when thus painted being deemed good enough for the native jewelry.

Antique engravings in Beryl are almost as rare as in the true Emerald; but with this difference, that intagli in the former stone, as far as my experience goes, belong to an earlier period of the art, being for the most part fine works of the "perfect" Greek school, whereas intagli in the Emerald are invariably of late Roman work, dating from Hadrian's time and his immediate successors. To quote a few of the finest, where too the material is hardly to be distinguished from the sapphire. The earliest is the Taras (or Icadius) on the dolphin, in the Praum Collection, the design of which is placed by Winckelmann in the first class of Etruscan work; a head of Proserpine in the purest Sicilian Greek style, and a hippocampus, both in the Marlborough Gems; and amongst the best specimens of Roman date, a head of Julia Domna in the same collection, and a most elegant design of Cupid borne over the waves by a dolphin amongst the Cracherode gems (British Museum). The grandest intaglio extant of the Roman period is also upon an Aquamarine of the extraordinary magnitude of $2\frac{1}{2} \times 2\frac{1}{4}$ inches; the bust of Julia Titi, signed by the artist ΕΥΟΔΟC ΕΠΟΙΕΙ. For nearly a thousand years it formed the knosp of a golden reliquary presented by Charlemagne to the Abbey of St. Denys, in which it was set with the convex back uppermost, being regarded as an invaluable emerald. The rarity of such Beryl intagli, when of unquestionable antiquity, is readily accounted for by the extreme value this, then so rare material, bore amongst the ancients, equal in fact to that

of the true Emerald: but its modern plentifulness, coupled with its beauty, has rendered it a favourite stone with the artists of the Renaissance and of succeeding times. These modern works may be distinguished as invariably executed upon the green sort or Aquamarine; the Aëroides or sky-blue of the ancients not being longer to be obtained, or else of much greater rarity. It is the vast supply poured in from Saxony, Siberia, and America, that has sunk the value of this beautiful stone so low in modern times. It possesses very great lustre, especially by lamp-light; hence the lighter-coloured varieties have long been used in jewelry as fraudulent substitutes for the true diamond, a deception noted as early as the end of the fifteenth century by Camillo Leonardo in treating of the tricks of the jewellers in his own times. At present it is similarly employed in Germany under the name of "Diamond of the Rhine." Hence it happens that people have often flattered themselves with being the owners of a diamond of enormous value, which, on examination by a skilful lapidary, has turned out to be nothing more than a small, worthless, Aquamarine. The stone has gone completely out of fashion in this country (though not in Italy), in consequence of the abundance in which it is now produced by the different regions above mentioned, and that too in masses often of enormous size, their dimensions reminding us of the monstrous smaragdi spoken of by Apion and Theophrastus. Thus in the British Museum are two Beryls from Acworth, New Hampshire, one weighing 48, and the other 83 pounds.

It is a curious fact that *Beryllus* is the Low Latin term for a magnifying glass: hence the German "Brille," a pair of spectacles. Hence Nicolaus de Cusa, bishop of Brixen (who died 1454), gave the name of "Beryllus" to one of his works, "because by its aid the mind would be able to penetrate into matters which otherwise it would be unable to pierce."[2] Which designation he

[2] A similar derivation exists in the French language, where "loupe," a magnifying or convex lens, comes from the Low Latin "lupa," an unpolished precious stone. The term seems to have been at first a simile allusive to the untamed condition of the stone. It appears restricted to the sapphire, a gem more or less convex in its native form. Thus, in the Jocalia Sti. Thomæ (Dart. Hist. Cant. Cath. Ap. xiii.) —Annulus magnus cum sapphiro ni-

thus explains in his second chapter, saying, "the Beryl is a shining, colourless, transparent stone, to which a concave as well as a convex form is given by art; and looking through it one sees what was before invisible." Probably the first idea of this invention was caught by accidentally looking through a double-convex and clear Beryl, or one cut en cabochon (the usual form given to antique transparent gems), and hence concluding that a piece of glass similarly shaped would produce the same effect in magnifying minute objects. Mediæval glass being never colourless, but always tinged more or less with green, the resemblance as to colour and form of a lens in such a material to an actual Beryl was sufficiently obvious to induce the communication of the name to the new discovery. Protoprodronius, as early as 1150, humorously describes the physicians of Manuel Comnenus as using the *ὑέλιον* to examine the nature of his evacuations: and this Lessing supposes very plausibly to mean a magnifying lens (Ant. Briefe, xlv.)—

"*Θεωροῦσι καὶ τὰ σκόβαλα μετὰ τοῦ ὑελίου.*"

Now this is the very term *ὕαλος* used by Socrates to describe a burning glass (and consequently a magnifying lens) in Aristophanes (Nubes, 758). By some lucky accident the observer of this property in his Beryl had been led by induction to apply a fact, similar to that involved in Nero's use of his Emerald lorgnette [Emerald] so many centuries before, to the working out of a most important result, through the happy thought that the marvellous effect was due not to the occult virtue of the gem itself,[3] but to the artificial shape of the stone.

In the absurd nomenclature of the English lapidaries in the last century, as Lessing has noticed, the name of Beryl was given to every variety of the Sard in which yellow predominated: the red alone, following the French example, was distinguished as the Cornelian. Dr. Woodward and Hill both

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gro qui vocatur lup.—It. Annulus cum parvo sapphiro nigro qui vocatur lup." That "lup" denotes the shape, appears from the next item, "annulus cum sapphiro quadrato aquoso."

[3] The concave emerald was supposed to aid the myopic eye, because its nature was beneficial to the sight.

notice this singular misnomer. In the same jargon the true Beryl is only mentioned as the Aquamarine. Even Natter, who should have known better, has adopted the same system of misnaming these stones, in the various Catalogues he has drawn up. Hence a fruitful source of error to foreign archæologists, who, trusting to the English description, give so large a proportion of works as upon Beryl preserved in our Cabinets which are in truth on Sard, according to the well-known rule of the vast preponderance in numbers of the latter over all other species, used by the ancients, collectively.

CALLAIS and CALLAINA: Καλλαϊνὸς λίθος.

Owing to a corrupt reading in Pliny, xxxvii. 33, the Callais is now universally understood by modern mineralogists to have represented our Turquois; but this identification seems hardly borne out by Pliny's description of the Callais or Callaina. "Next to the Topazion (Peridot) in appearance, though not in value, comes the Callaina, of a pale yellow mixed with green.[1] It is produced beyond the remoter parts of India, amongst the tribes of Mount Caucasus—of remarkable dimensions, but full of holes, and of dross (fistulosa). A clearer and better kind is that obtained in Carmania. In both countries it is found adhering to the surface of the rocks, and protuberant therefrom, in the figure of an eye. These being inaccessible, they knock down the gem with bullets from slings, with all the moss that surrounds it. The gem is shaped by cutting (with the chisel), being too brittle to be worked in any other manner. The best have the colour of the Emerald, so it is plain that they please with a borrowed beauty. No gem is more improved by setting in gold, and gold itself is better set off by no gem. The better kind lose their colour by wetting with oil, grease, or wine; but the inferior retain it more permanently. No other stone is so easily imitated by deceptive paste."[2]

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[1] Pliny's peculiar term for its colour, "e viridi pallens," can only denote a preponderance of pale yellow over the green. For *pallidus* (like χλωρὸς, in speaking of the complexion) signifies a pale yellow, as clearly is shown by the comparison, "pallidior buxo." Pliny's Topazius, on the contrary, is "in suo genere virens," for here the green was the predominant tint. Another proof, added to those remarked below, that he is treating of mere varieties of the same material.

[2] "Mendaci vitro." Nothing resembles the Peridot so closely as a thick fragment of green bottle-glass. Hence Orpheus (277) actually uses the epithet, ὑαλοειδέες τόπαζοι. Light-green transparent pastes are the commonest among the antique; imitations of the blue, opaque Turquois, on the ntrary, do not occur.

All these particulars indicate a pale-green and *transparent* stone; an inferior Peridot, in short, or rather the Peridot itself, as distinguished from the Chrysolite, to which it yields considerably in hardness. The expression "full of holes and of dross" is quite repugnant to the idea of an opaque solid body like the modern Turquois, the general characteristic of which would certainly not be described as a pale-green. The Peridot also exhibits the "singular magnitude," as compared to other gems, and, from its softness, is extremely difficult to polish. Its colour, too, evaporates by exposure to the light. De Boot conjectured that the Aquamarine was intended under this name, but the superior hardness of that stone is sufficient to overthrow such a hypothesis. The notice of the Callais (or Callaica) in Solinus is to the same effect as the above, except the addition "that it comes next to the Emerald in price and estimation," which further supports my idea.

There seems very good reason for the conjecture of Salmasius (adopted in Jan's edition) that *Callaina* was the original reading in *this* chapter of Pliny; a name derived from a peculiar green dye, the Callaicum. Amongst the Indian exports mentioned in the Periplus of the Red Sea are "pepper, the gem *Callaïnos*, Lapis-lazuli, indigo." If this be correct, Pliny's *Callaina* would be a variety of the Topazion, but derived from India and Persia; whilst the original and best kind was considered peculiar to the island of the Red Sea where it was first discovered.[3]

But the *Callais* entered in the alphabetical list of gems (c. 56), and therefore distinct from the *callaina*, has much better claims to represent our Turquois, for "it resembled the Lapis-lazuli, but was whiter (candidior), and like the colour of the sea where shallow."

The older mineralogists, like De Boot, took the Jaspis aerizusa, "sky-blue Jasper," to be the true Turquois, but without reason, that stone being indubitably the Sapphirine Calcedony. Our

[3] Peridots vary greatly in colour. Those of the deepest green are naturally by far the most esteemed; others again are almost colourless. Such a distinction was quite sufficient to oblige the Greek mineralogist to class the Topazion, deep green, and the Callaina, pale green, under different species.

Turquois was the Hermean and Persian Smaragdus, "protuberant, not *transparent*, of an agreeable and even colour, like the eye of a leopard or cat; losing their colour in the sunshine, but lustrous in the shade, and conspicuous from a greater distance than any other gem;" a distinction of the Turquois being that its colour is improved by candlelight, when, even though greenish, it becomes a perfect celestial blue. A singular confirmation of this view is found in the translation of Σμάραγδος by Mesues the Arabian into *Firuzegi*,[1] the Persian name of the Turquois.

The "fossil ivory" of Theophrastus (37), "dark blue, mottled with white," is the Occidental Turquois, in which the osseous structure is plainly visible to the microscope, and which besides is much softer than the true Oriental (termed by the jewellers "de la vieille roche"), which strikes fire with steel. According to Hill, the blue which mottles the surface of the former can, by means of heat, be diffused throughout the mass, thus greatly improving its appearance, and enabling it to be passed off for the more precious variety. The stone probably became known to Theophrastus by its occurrence in the spoils brought home from Persia by the Macedonian soldiers, the cups and armour of gold—the Turquois then was no doubt lavished over all their decorations by the ancient Persians with the same profusion as by their modern descendants.

That our Turquois, *i. e.* Turkish stone, a name in itself having an analogy to the antique Persicus Smaragdus, was in fact the latter substance, is to a certain extent shown by Theophrastus's notice of the employment of this in λιθοκόλλητα or inlaid work. Although no specimens of his times have come down to us, we may safely conclude from the invariableness of Oriental usages that Persian inlaid jewelry then as now was set, or rather incrusted, with nothing but the Turquois. When enamels came into fashion under the (late) Lower Empire, their prevalent blue was intended to represent, economically, the precious material. Indeed the Merovingian lanx of Gourdon (perhaps a Byzantine work) has in each angle an inlaid heart formed in Turquois.

We need not be surprised at the term Smaragdus, the synonym

[1] "The Victor," an epithet showing its high repute amongst the Persians.

for *green*, being applied to a stone now only valuable when of a pure *blue*. Even in the last century, according to Dutens, many preferred the Turquois of the former tint when pure and unclouded.[5] The very rare antique works in relief remaining to us in Turquois are in this green kind; the principal being the head of Tiberius at Florence, in a stone as large as a walnut, and in full relief; and the busts of Livia and the same emperor when a boy, in half-relief, on a much larger Turquois in the Marlborough Gems,—a work of extraordinary excellence. The same collection contains a still greater rarity—a small cameo portrait of a Greek prince in a Turquois beautifully azure, and "de la vieille roche." Antique intagli upon this stone, owing probably to its want of hardness, do not exist. It was much employed by the Renaissance artists for small heads and for camei; such being the actual origin of almost all these small works, though usually regarded as antique.

The stone has pretty much the same chemical constituents as the Lapis-lazuli, but seems rather softer, and for the most part becomes decomposed and chalky by long lying in the earth, as is often to be seen in those set in the jewels only a few centuries old.

Mohammed Ben Mansur says, the best Turquois come from Nishapur, others from Ghasna, Irak, and Kerman. Of the first he makes seven varieties, according to their degrees of hardness and their tints: that named after Abu-Ishak being the best, and the Andelibi (of a milky hue) the weakest. His fourth, Sermuni, with gold spots, is rather a kind of Lapis-lazuli. As to its properties, it grows clear or dull according to the weather, and on rainy days has a greater circumference than on fine. One sort gains a better colour if steeped in oil, but loses it again. According to the time since it has been dug, the Turquois is divided into that "of the Old," and that "of the New Mine:" the latter does not keep its colour.

Few gems were invested with more wonderful properties than the Turquois by the credulity of mediæval naturalists, a long list of which are given by De Boot, who vouches for some of the

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[5] De Boot describes the best as "exactly the colour of purified verdigris, presenting to the eye the pleasing greenness of a milky blue."

strangest upon his own experience. Thus, besides strengthening the eyes, and cheering the soul of the wearer, it took upon itself the consequences of any fall that might happen to him; by cracking itself saving him the fracture of a bone. It grew paler as its wearer sickened, lost its colour entirely on his death, but recovered it when placed on the finger of a new and healthy possessor. Suspended by a string and within a glass, it told the hour by the exact number of strokes against the sides.

Hence it was sought after above all other gems. De Boot, in 1609, remarks that no gentleman then (ladies did not wear it) thought his hands properly ornamented, or his elegance complete, without the acquisition of a fine Turquois. One the size of a large pea used to sell for 10 thalers; but if it attained the size of a hazel-nut (the utmost limit then known), it was worth 200 or even more.

There are some grounds for the conjecture that the Callaina may have been the softer variety of the Chrysolite, called Olivine from its colour. It is a silicate of Magnesia coloured green by iron, and possessing considerable lustre, though now but little valued by jewellers. It is found in rounded masses in the cavities of Basalt and of Lava: characters bearing some analogy to the Callaina "sticking upon rocks, and protuberant like an eye." The difficulty of polishing the stone, which does *not* exist in the case of the Turquois, applies strongly to every species of Peridot. *Augites* (Eye-stone) Pliny notices was considered by many to be synonymous with the Callaina:[6] it may perhaps be but an accidental coincidence of names, but the substance now called Augite is generally found in company with the Olivine in the Basaltic matrix: being nearly the same in chemical constitution, but black and unfit for employment as a gem.

The Olivine is the only precious stone of the existence of which beyond the limits of our world we have actual proof, for grains of it have been discovered filling the cavities of aërolites, from whatever unknown regions in space these objects may have emanated.

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[6] "*Augitis* non alia videtur multis esse quam Callaina."

CAMAHUTUM: *Camaut: Cameo.*

Of this word innumerable etymologies have been proposed, all equally unsatisfactory, as Menage long ago observed. The list begins with De Boot's simple and obvious derivation from Pliny's *cyamea*, and goes on to the most far-fetched of all, Lessing's, who makes it the corruption of *Gemma onychina*, taking for his starting-point the Gothic form *Gamaluia*, to be found in Agricola, and explained by him as "gammen-hu," *bacon-stone*, a popular name expressive of the fatty streakiness of its composition.

But the only safe mode for tracing out the true source of the word, so diversely written at various times, is to examine in what form it makes its first appearance in any European language. Of such the very earliest example known to me occurs in the list of gems collected by our Henry III. for the embellishment of his projected shrine of Edward the Confessor, amongst which are described above eighty camei, of which fifty-five are particularised as "large." (This list is to be found in the Patent Rolls of his 51st year.) The word is spelt at length *camahutum*, and abbreviated *camah'*. His contemporary Matthew Paris Latinises it into quite the modern form (Vita Leofrici), "lapidibus nobilibus insculptis quos *cameos* vulgariter appellamus." Later, in the year 1341, we find the great French Cameo entered in the inventory of the Trésor de S. Denys as "unum pulcherrimum *camaut*." Now, the term is evidently of foreign origin, and in these early lists it seems to designate rather the species of the stone than the nature of the work upon it, which the writer in each case particularly describes. Hence *Camaut* may be safely put down as the original form of the word. Now *Camea* is said to be Arabic for a talisman, for which with that nation every

engraved stone passed. This latter word has puzzled philologists, but the true connexion of ideas appears to me to be this. M. Ben Mansur has (Div. ii. No. 2), "The *Camahem*, called by some the Ass-stone; it is very hard, can only be pierced by the Diamond; if broken, it separates into fine splinters. Rubbed down on a hard stone, it gives out a *red* colour. The finest sort is the Black Red dug up in the district of Karak." Meaning unmistakeably our compact Hæmatite; giving its distinctive characters, the iron-grey colour (that of an Ass-hide), its hardness, splintery fracture, and red streak. Now this stone being frequently a Magnet is the substance chosen, before all others, and from the very earliest times, to engrave talismans upon. Its use begins with the Babylonian Cylinders (most abundant in this), and ends through the Gnostic series with the Cufic stamps of the 8th and 9th centuries. Thus we can perceive how *Camahem* the common material for a talisman, came to be identified with the talisman itself. Camillo Leonardo, writing at the end of the Middle Ages (his 'Speculum Lapidum' is dated 1502), has the Camahem in view when talking of the stone Kaman, and Kakaman, a name he absurdly enough derives from Καῦμα, from its volcanic origin, adding, "it is like the Onyx:" by which he doubtless refers to the *engraved* Cameo. These latter works he actually talks of (in his dedicatory preface to Cesare Borgia) as Gemmæ Chamainæ.

I am tempted to think that Camaut came to be applied to gems in relief, as being talismans *par éminence*, seeing how the Arabs have ever looked upon all ancient bas-reliefs as magical; and therefore the word came into Europe in the vocabulary of the Crusaders in this restricted sense. Intagli, on the other hand, they continued to use whenever they could procure them for personal seals, *secreta*, and distinguished such by the name Sigilla, the diminutive of Signum, in its sense of signet.

Important Camei are not unfrequent which have been converted into Gnostic amulets by the engraving of their customary types and formulæ upon the reverse. I have noticed examples in the Royal and in the Marlborough Collections. The latter example is a fine Cameo bust of Commodus: on the reverse

has been added a figure of the Abraxas-god surrounded by the legend—

ΑΡΔΟΥ ΓΕΝΝΑΙ ΟΔΕΜΕΝΑΙ ΒΑΣΙΛΙΣΚΩΣ—

which supports the derivation of "Cameo," now the most popular, from a supposed Hebrew or Arabic word, "Camea," a spell. Such additions testify to the feeling with which such works were regarded when the night of barbarism was spreading over the old Roman world.

The original "Camaut" became in mediæval mouths the ugly Teutonic Gammahuia, Camahuia, the soft Italian Cameo (to be found in Cellini and Vasari), and the fantastic French Camayieu, in which form it first appears in English. But from the very first *Camèo* signifies the work itself, not the stone; for De Boot, at the end of the Cinque-cento period (1609) notes "that the Italians term the Onyx, when engraved with figures in relief, Cameo, and *Camehuia*, as if the latter were a different substance."

This list of etymologies may be concluded by the novel and ingenious one (the latest propounded) of Von Hammer's, from the Arabic of the same sound signifying either "a flower" or the "top of the camel's hump."

CARBUNCULUS: Ἄνθραξ: *Ruby*, and *Garnet*.

The modern name for this stone, Ruby, *Rubino*, is merely an epithet expressive of its distinctive colour, as being the *Red* variety of the Hyacinthus. For, one of the inexplicable chemical enigmas of Nature, the Ruby and the Sapphire, though differing so greatly in appearance, are chemically the same substance, pure Alumina. For the same reason Marbodus calls this division of the Hyacinthus "Granatici," from their resemblance in tint to the crimson juice of the pomegranate. This was the first Ἄνθραξ of Theophrastus (18), a name signifying a live coal, because it was blood-red in colour (ἐρυθρὸς); but if held up against the sun, assumed the appearance of a burning piece of charcoal. He terms it very valuable, inasmuch as a small ring-stone used to sell for 40 gold staters (40 guineas), a statement which could hardly apply, in his age of high civilization and extended commeree, to our Garnet or Carbuncle, a common stone, and produced abundantly in many parts of Europe. The true Ruby must likewise be included amongst the numerous species of the Carbunculus described by Pliny (xxxvii. 25), though, as De Laet has justly observed (i. 2), there can be no doubt that he classed under that head every kind of red, transparent, fiery stone; both the Ruby, the Pyrope, the Almandine, and the Red Jacinth. One of the qualities, however, which Pliny assigns to his Carbunculus, that of not being affected by the fire, whence they were called "Acausti," applies exclusively to the Ruby, for the Garnet easily fuses into a dark globule of oxide of iron. Henckel relates an experiment in which a Ruby was sufficiently softened by means of a powerful burning-glass to receive the impression from a Jasper intaglio, without the slightest detriment to its original colour or hardness on its cooling. The same con-

clusion may be deduced from the brief notice in Theophrastus, who particularises, amongst the "polygonal" ones found in the neighbourhood of Miletus, some having "six" angles. Now the numerous angles of the common garnet, a rhombic dodecahedron, form its most distinguishing feature; whilst the Spinel Ruby is a perfect octahedron, and therefore presents but six angles: and the perfection of its singular form would naturally fix the attention of the early mineralogist. Pliny gives the first place to the Carbunculi Amethystizontes, "in which the extreme blaze goes out in the purple of the Amethyst." These were our Almandines, as well as our Spinels, for the difference between the two is hardly to be appreciated by the eye alone.

But the true Ruby and its inferior varieties can with greater certainty be referred to that class of the Carbunculi described separately by Pliny as the *Lychnis*. It belonged to the same family of fiery stones as the Carbunculus, was of pre-eminent beauty, and derived its name from its property either of lighting up lamps, or of lighting up itself by lamplight (a lucernarum accensu). The former explanation of his meaning is supported by Orpheus, saying of his Lychnis (Λιθικὰ, 270), "from off the altars, thou, like the Crystal, dost send forth a flame without the aid of fire." It was produced in Orthosia, in the whole of Caria and the neighbouring regions; but that most esteemed came from India:[1] "which last some have termed a Carbuncle of milder tint." The second in rank is the Ionia, so called from its resemblance to the flower of the same name (the Greek Ἴον, or Red Cyclamen). "And between these last I find a difference noticed, one kind having a purple lustre, the other a red (cocco, kermes). Warmed in the sunshine, or by friction with the fingers, they attract straws and scraps of paper."[2] The description of the same

[1] The Greeks carefully distinguish the first class amongst the Ἄνθραξ species by the epithet of "Indian." Thus the Golden Vine, beneath which the King of Persia used to sit in state, had bunches of grapes in Emeralds and in "Indian Carbuncles," and in all kinds of other gems exceeding in value (Ath. xii. 539). There can be no dispute, however, that no distinction was then made between the fine Siriam Garnets, the Spinel, and the Ruby.

[2] The Carthaginian Carbunculus (xxxvii. 30), though of less value than the Lychnis, was said also to exhibit this electric property; another argument that the Ἄνθραξ of Theophras-

stone given by Solinus is, according to his custom, much more definite than the above, and more that of the practical gem-dealer. He calls the species "Lychnites," because they shine most by lamplight; it is both of a transparent purple and of a light red, and attracts bits of thread, straws, &c., when rubbed, or heated in the sun. It is very difficult to engrave, and *then* pulls away the wax as though by the bite of a living creature, "velut quodam animalis morsu." Now all these qualities can be found combined in no other stone but the Ruby. The best still come from India (Ceylon), though inferior ones are sometimes found in Bohemia.[3] The best Ruby burns with the redness of the alchermes dye; the Balais is of the same tint more diluted, or of a lilac; the Spinel, of the richest crimson tinged with blue. In hardness they are only surpassed by the Diamond and the Sapphire; in fact, none but Oriental artists have attempted to engrave upon them in modern times. But the character noted by both these ancient mineralogists, which decides the question beyond all cavil, is their remarkable electricity. I have ascertained by actual experiment (and seem to have been the first to make the discovery) that both the Spinel and the Balais possess this property in the highest degree; to the same extent indeed as the Sapphire or Brazilian Topaz. That early author Erasmus Stella (1517) interprets *Lychnites* by Almandine; but the latter, a mere species of the Garnet, is non-electric, a fact which entirely excludes it from the descriptions of Pliny and Solinus.

It is curious that the name *Spinel* should be merely an equivalent of Carbunculus, being a diminutive of Σπινος, σπινθηρ, a spark. Theophrastus (13) describes by this name a mineral found at Binæ, which broken to pieces and piled up in the sun ignites spontaneously, the more readily if sprinkled with water; but this must therefore have been Iron Pyrites.

"Balais" is absurdly explained by De Boot as a corruption of Palatium, being the "abode" or matrix of the true Ruby, accord-

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tus, "brought from Carthage," was a true Ruby. The *native* Garnet cannot be rendered electric by any amount of friction, but can when *facetted*.

[3] Tavernier mentions having seen a magnificent Bohemian Ruby, not to be distinguished from the finest Indian, on the finger of the famous Wallenstein. They were found on breaking open certain flinty nodules.

ing to the doctrine of his day that every Precious Stone was produced in a matrix consisting of an inferior variety of the same subject-matter. But De Laet comes nearer the mark in quoting Marco Polo's notice of a mountain, Ballaheia, in India, supplying this stone and giving it the appellation.

Another argument, perhaps of some weight, as founded on old tradition, in support of the identity of the Balais with one kind of the Lychnis, is that Camillo Leonardo ascribes the same supernatural virtues in averting hail and tempests to the Balais, which Orpheus has given to his Lychnis.

The Romans experienced the same difficulty that exists now in distinguishing the various kinds of their Carbunculus from each other in consequence of the practice of jewellers to back them with various foils so as to improve their colour: "tanta est in illis occasio artis, subditis per quæ translucere cogantur." A delusion this, especially to be observed in works of the Renaissance, where heads in relief, set in rings, often appear like the finest Rubies; but are in fact only Garnets backed by a ruby foil. It was also believed in Pliny's time that the dull-coloured Carbunculi could be made lustrous by maceration in vinegar for the space of fourteen days: and that the effect lasted for the same number of months. These gems were also imitated so exactly in paste, that the false could only be distinguished from the true by touching them with the emery-stone (cote): the artificial substance being softer and brittle, inferior in weight, and sometimes showing silvery air-bubbles in the interior. And this is true to the letter, for in no other colour, except the Emerald, have the ancients been so successful as with the Ruby, in the making of their pastes: thus an antique paste lately came under my notice bearing a splendid intaglio of Medusa's Head, which could with the utmost difficulty be detected to be not an actual Carbuncle, even showing all the flaws within its substance to which the real stone is so liable. These flaws in the imitative gem are produced designedly, by suddenly cooling the paste upon its withdrawal from the furnace.[4]

[4] The monster Ruby of Charles the Bold, set in the middle of a golden rose for a pendant, captured by the Bernese after his rout at Granson, turned out, when purchased by Jacob Fugger, to be false. It was of a some-

True Rubies, and of good colour, uncut but with their natural surface rudely polished, occur both inserted into pieces of antique jewelry, and set in rings dating from the earliest times. In the Herz Collection was a necklace formed out of native Rubies and Emeralds of fine colour and as large as horse-beans, drilled through and elegantly linked together with strong twisted gold-wire, in a similar manner (though much more substantially) to the Sapphire necklace from Rutupiæ noticed under Hyacinth. Such a mode of employing these very hard gems was long maintained. De Laet, writing in 1647, states that Rubies were then very generally set unpolished both in rings and in ladies' ornaments; for, "unlike the Diamond that hath no beauty save when shaped and polished, the Ruby charms without any aid from art."

The Ruby, though of the same chemical composition as the Sapphire, slightly yields to it in hardness; the Spinel, again, into which a small proportion of magnesia enters, is still softer: nevertheless, antique works in either are even more uncommon than on the Sapphire itself. As now, so in ancient times, the Ruby was far the rarer of the two, and therefore to violate its beauty by an engraving was regarded as the extreme of imperial extravagance. In fact, the experienced Lessing (A. Br. lxxix.), and later the Count de Clarac (Cat. des Artistes Gr. et Rom.), altogether deny the existence of any really antique intagli in these harder gems; but the instances to be adduced under "Emerald" and "Hyacinthus" sufficiently prove that this rule, though generally true, yet admits of some, though rare, exceptions. Here is the place to remark that engravings on any of the "Precious Stones" are always to be examined with the greatest suspicion; modern artists, working for wealthy patrons, having found it their interest to employ such materials as could recommend themselves to their purse-proud employers by the mere value of the substances (a thing which, at least, they could appreciate), as well as by the art thereupon displayed, which, in

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what irregular heart-shape, one inch in the widest, and no doubt had come down to the Duke from the Roman times.' (Figured in Lambeccius, Bib. Imp. i. 516.)

their eyes, would be frequently but a minor consideration. The ancient artists, on the contrary, chose only such stones as were best suited for the execution of their work, and for rendering the most perfect impression of it when required for use as a signet; always, for both these reasons, preferring the Sard, in which more engravings by the famous masters of antiquity will be found executed than in all the other gems put together. Entirely devoted to the one object, that of attaining to artistic perfection, they altogether disregarded the paltry glory of overcoming difficulties by the fruitless expenditure of their invaluable time (a point in which many amongst the moderns, notably Louis Siries, placed their chief claim to reputation); neither did they ever dream of seeking for renown rather by the preciousness of the material than by the excellence of the work itself.

Nevertheless, a few works in Ruby of apparently indisputable antiquity have been observed by me amongst the thousands of other gems examined. First, on account of the quality—a large oval slightly convex stone, of the true "pigeon's blood"[5] tint, and weighing apparently about 3 carats—is one in the Devonshire Parure (No. 17 in the Bandeau), engraved with a Venus Victrix—a but poor intaglio in the latest Roman manner. A full-length figure of Osiris in half-relief, seems a production of the Egyptian Revival under Hadrian. In Spinel, a most spirited Gorgon's Head in the Rhodes Gems, and a head of Pertinax, now in my possession.[6] In Balais, the finest head of a Bacchante in existence, seen in front face, and crowned with ivy, the expression of the countenance full of a wild inspiration, and the treatment of the flesh and of the flowing hair beyond all praise: a masterpiece belonging to the best days of Roman Glyptic art. For, at the side is perceptible in neat, but almost microscopic, letters the name ΕΛΛΗΝ, previously known as occurring upon an exquisite bust of Antinous repre-

[5] The test of a perfect Ruby is its exact agreement in colour with the fresh blood of a pigeon dropped upon the same sheet of paper on which it lies.

[6] Other intagli in Spinel might be quoted; in fact, they are far from being of the first rarity (in the Sassanian class), but the stone is usually mistaken for the Almandine.

sented as Harpocrates (Berlin). This gem has been pronounced antique by the best judges in Paris, and was bequeathed as a most precious souvenir by the late possessor, L. Fould, to Baron Roger (l'ainé).

Some very noble intagli have also been left us by the Italians of the early Renaissance: for instance, an intaglio, a head of Thetis capped with a crab's shell, deserves especial mention from the similarity of its style to the best Greek—the stone large, irregular, and of a pale rose-colour, formerly in the Herz;[7] and as a work in relief, a head of Serapis in front face, executed in the grandest manner upon a large stone of immense value, by far the first amongst the *engraved* of the Hope Cabinet of Precious Stones.

The names Carbunculus and Lychnis gave rise to many wonderful stories, suggested by them to the fancy of the credulous Greeks. Thus Ælian relates (H. A. viii.) how a certain widow, Heraclea by name, had tended a young stork that, having fallen out of the nest before it was fully fledged, had broken its leg, and how the grateful bird, on returning from the annual migration of its kind, dropped into her lap, as she sat at her door, a precious stone, which, on her awaking at night, she found to her astonishment had lighted up her chamber like a blazing torch.[8] A similar description is that retailed by Lucian in his account of the statue of the Syrian goddess (Astarte). "The goddess wears on her head a gem called Lychnis (lamp-stone), a name derived from its nature; for from it a great and shining light is diffused in the night-time, so that the whole temple is thereby lighted up as though by many lamps burning.[9] By day the lustre is more

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[7] Now Baron Rothschild's.

[8] The Lychnites is spoken of by Philostratus (Vit. Apoll. ii. 14) as placed by the stork in the fabric of her nest for an amulet against serpents. This explains why Ælian's stork should have selected the Ἄνθραξ for his fee to his nurse. The luminous property of the latter is thus improved upon by Psellus (De Lapid. xii.): "The Lychnites is a stone that gives the power of seeing in the dark (νυκτάλωπος) if hung round the neck. It also cures fluxions of the eyes, if tied in a linen cloth upon the forehead."

[9] Plutarch (De Fluv.) has: "In the Hydaspes is found the stone called *Lychnis*, resembling oil in colour, and highly polished. It is discovered when the moon is waxing, to the sound of fifes, and it is worn by people of exalted rank."

feeble, nevertheless it still presents a very fiery appearance."[1] Alardus, a Dutchman, writing in the year 1539, caps this legend with the following wonderful account of a similar gem: "Amongst other stones of the most precious quality, and therefore beyond all price and not to be valued at any equivalent of human riches, the gift of that most noble lady Hildegarde, formerly wife of Theodoric Count of Holland, which she had caused to be set in a gold tablet of truly inestimable value dedicated by her to St. Adelbert, patron of the town of Egmund; amongst these gems I say was a Chrysolampis, commonly called an Osculan, which in the night-time so lighted up the entire chapel on all sides that it served instead of lamps for the reading of the Hours late at night, and would have served the same purpose to the present day, had not the hope of gain caused it to be stolen by a runaway Benedictine monk, the most greedy creature that ever went on two legs. Afterwards, however, from the fear of being convicted of sacrilege by having so notable a gem in his possession, he threw it away into the sea near Egmund. Some traces of this stone still remain in the upper border of the before-mentioned tablet."[2] Creuzer, in his 'Description of the Tomb of St. Elizabeth at Marburg,' states that the same belief was to the last firmly held by the common folks as to the nocturnal luminousness of the huge "Karfunkel" set above the statuette of the Saviour upon the principal façade of this magnificent Chasse, made in the year 1249. This stone, on examination by him before 1808 (most of the gems were stolen after the removal of the Chasse to Cassel), proved to be no more than a common yellow Crystal or German Topaz, possessing, it is needless to add, no phosphorescent quality whatever.

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[1] Epiphanius, under "Carbuncle." "When worn it is impossible to conceal it; for notwithstanding whatsoever clothes it may be covered over with, its lustre shows itself outside its envelope, whence it is called the Carbuncle." And almost in the same words, M. Ben Mansur: "The Bidschade (Garnet) is a clear stone of a pure water, that often loses not its lustre even when under the clothes."

[2] Two centuries before Alardus, Sir John Mandeville, speaking as an eye-witness, hath: "This Emperour (of Cathaye) hathe in his chambre, in on of the pyleres of gold, a Rubye and a Charboncle of half a fote long, that in the nyghte semethe so grete, clartee, and shynynge, that it is als light as day."

Such a property, indeed, belongs to no other precious stone than the Diamond, and *that* only retains it for a few minutes after having been excited by exposure to the sunshine, and then immediately carried into a dark room. This singular phenomenon must often have attracted the notice of Orientals on entering their gloomy chambers after long exposure to their blazing sun, and thus have afforded ample foundation to the marvellous legends built upon this simple fact by their fertile imaginations. If the Diamond possessed this virtue, *a fortiori*, reasoned they, it must also characterize the Ruby—a stone held by them then, as now, in so much higher estimation.[3] Gesner, her contemporary, relates that our Catherine of Arragon used to wear a ring set with a stone luminous at night, which he conjectures was a Ruby. Fraught with historic associations to the minds of Englishmen beyond all other gems is the huge Ruby set in front of the great Crown of England, having been a present to the Black Prince from Pedro the Cruel, on the victory of Najera in 1367, and afterwards worn upon his helmet by Henry V. at the battle of Agincourt. It is an irregular oval, pierced through the middle, after the usual Indian fashion; and having this perforation filled up with a small stone of the same kind to conceal it.

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[3] Mohammed Ben Mansur puts the "Jacut" (after the pearl) at the head of the precious stones, and of this species the rose-coloured (Ruby) the first. He wrote in the 13th century.

CERAUNIA.

By this name two very different things are designated, according as the idea expressed is a resemblance in the stone to the brightness and flashing of lightning, or its being the actual missile itself.

The first part of Pliny's description (52) applies clearly to either the bright Blue Beryl, or to the paler and more lustrous kind of Sapphires. "Amongst colourless (candidas) gems is that called *Ceraunia*, which snatches its lustre from the stars (alluding to its celestial origin). Of itself it is like crystal, but its lustre is sky-blue; it is found in Carmania. Zenothemis allows that it is colourless, but that it contains a sparkling star; there are also Ceraunias that are dead, yet if steeped for a few days in nitre and vinegar they conceive the same kind of star, but lose it again after the same number of months." This would seem to indicate an Asteria or Star-Sapphire; in fact, the Ceraunia is termed an inferior kind of Astrion. Later, however, the name seems to have been applied to the Ruby to distinguish it from the other numerous varieties of the Carbunculus, for Tertullian (De Anima, ix.) uses the simile: "In the gem *Ceraunia* the substance is not necessarily fiery because they sparkle with a ruddy blush (rutilato rubore)." Isidorus also makes two sorts: one like crystal, but blending an azure with its red, found in Carmania; the other from Lusitania, like the Pyrope, but setting the fire at defiance,—the last character a proof that he is speaking of the Ruby.

In these gems, therefore, *Ceraunia* or *Ceraunias* was no more than an epithet, "Lightning-like," applied to any especially lustrous stone of the Corundum class.

But the second part of Pliny's notice introduces a very different and most curious idea. Isidorus indeed pretends that the gem falls from the sky in thunderstorms, but this is merely a theory of his own to explain the name, for he adds κεραυνὸς in Greek signifies lightning. But Sotacus, as quoted here by Pliny, "makes two other kinds of the Ceraunia (besides those first noticed), the black and the red, resembling *axes* in shape. Of these, such as are black and round are holy things, cities and fleets can be captured by their means, and they are called *Bætyli*, but those of an elongated form *Ceraunicæ*. Others make out a third sort, greatly sought after by the Magi, inasmuch as it is only found in places struck by lightning."

This last remark seems to have been the origin of the etymology of Isidorus referring to gems of a totally different character.

The comparison of the second and third class of Ceraunicæ to *axes*, at first sight so inexplicable, becomes quite intelligible when we recollect that the popular German name to this day for the stone-axes of the primeval Celts is "Donner-keil," or thunder-bolt. Such they still believe fall from the sky in storms, and are to be dug up wherever the lightning has penetrated the earth. Thor, the Teutonic Jove, is represented armed with a huge stone-hammer, in the place of the classical winged thunderbolt. As these primeval weapons are often exhumed in the neighbourhood of old Teutonic temples, it is probable they continued to be used as sacrificial implements (in memory of ancient customs) long after they had been superseded by metal in common life. We know that the Romans in ratifying a treaty killed the victim with such an instrument, "silice percussit;" whence the proverb "inter sacrum et silicem," which could not have been a stone casually picked up, but one sharpened and fitted to a handle, so as to be capable of dealing a mortal stroke at one blow.

These considerations explain why Sotacus terms these axe-like stones "holy." They are still highly reverenced by the German boors, and considered a specific against all diseases in cattle: hence Kerner, who has figured many of them, had the greatest difficulty in purchasing specimens from the lucky finders. The distinction Sotacus makes as to the difference in their shapes

agrees wonderfully well with that to be noticed in existing examples. His *Bœtyli*, black and round, are the hammers perforated to receive a handle (Beetle is Saxon for mallet): the more elongated *Ceraunicæ* seem analogous to the stone celts of an earlier manufacture, and more plentifully discovered.

These stone axes puzzled the learned of the 16th century fully as much as the ruder forms now exhumed at St. Acheul do our geologists. Gesner (1562) adduces the testimony of eye-witnesses to the fact that such had been found in a windmill immediately after it had been struck by lightning, and similarly under an oak, and other places. He mentions the popular belief that the "Strahl-pfeilen" or "Strahl-hammern" (lightning-arrows or hammers) penetrated into the earth to the depth of nine fathoms, and then rose up towards the surface at the rate of one fathom in a year. De Boot quotes many similar instances of their discovery under the same circumstances, but, unable to resist the evidence of human workmanship which they exhibit, ingeniously conjectures that they had been originally iron tools, but converted into stone by long continuance in the earth.

The *Iris*, mentioned by Pliny as next in estimation to the Ceraunia in the opinion of the Magi, was nothing more than a piece of Rock-crystal which had accidentally assumed the form of a prism, so that within a room it was capable of forming the prismatic spectrum upon the wall. A most beautiful object truly, and well adapted to excite a belief in the supernatural virtues of the stone in the minds of people ignorant that the effect was due merely to its form. It was remarked as strange that when placed in the sun it did not produce the rainbow colours, but only when under the shade of a roof. Pliny observes that the stone itself did not contain the colours, but that they were elicited by the reflection of the wall. In all other respects it resembled the common crystal, and was found in an island in the Red Sea, sixty miles off Berenice.

There was another gem resembling this in appearance, but not in effect, and therefore called *Leros* (empty), which was a Crystal crossed by a white and black cloud.

The gem now known as the *Iris* is a Crystal containing many natural flaws, which by the refraction of light produce the most

beautiful play of colours internally, resembling sheets of flame. The Iris can be artificially produced by flawing a Crystal with a sharp blow of a mallet, or by throwing it into boiling water.

Besides the Ceraunia, Pliny (65) enumerates other stones that fall from heaven amidst thunderstorms and rain, such as the Ombria, called by some the Notia (Rain, or Scirocco-stone), and the Brontia (thunder-stone), all supposed to possess the same virtues. It was also pretended that if the latter were laid upon an altar, the offerings could not be consumed as long as it remained there. Another version, "if we have faith sufficient," says Pliny, was that the Brontia got into the heads of tortoises after thunderstorms, and was to be found in their brain. This possessed the virtue of extinguishing all fires caused by lightning.

The fossil Belemnite, popularly called Thunderbolt in England, was a few years ago (in my recollection) universally believed to fall from the sky under the same circumstances as the Ceraunia; perhaps, indeed, the Bætyli of Sotacus, "black and round," may have signified this fossil, and not the artificially-made Celts.

CHALCEDONIUS.

The Chalcedonius of Pliny was an inferior species of the Smaragdus, so called from being found in the copper-mines near Chalcedon. The supply of them had failed before his times, the mines being no longer worked; but he describes them as small and brittle, changing their colour when moved about, like the green feathers in the necks of peacocks and pigeons. But from the remark of Theophrastus (25) that they were seldom found large enough for ring-stones, but were used for soldering gold, and answered that purpose quite as well as Chrysocolla, it is evident that they were only crystals of transparent Chrysocolla, still popularly termed the Copper-Emerald, and which to the eye have much the appearance of the true Peruvian gem.

It is difficult to trace the steps by which this name has been transferred from a substance of a brilliant green colour to one so totally distinct in all its characters as our Calcedony (White Carnelian), a semi-opaque quartz of a milky tinge, and answering exactly to Pliny's Leucachates. The transition would appear to have been thus effected. The epithets Calchedonius and Carchedonius, so readily confounded together in the uncertain orthography of MSS., became inextricably intermingled in the ideas of the mediæval mineralogists. Now his Carchedonius, so called as being brought from Carthage (Καρχήδων), was a Carbuncle, showing as it were stars within its substance, and of sufficient size for cups to be cut out of it. Epiphanius and the Vulgate render Χαλκηδών, the third stone in the foundations of the New Jerusalem, by Smaragdus, but the A. V. translates it "Carbuncle." Marbodus adopts both renderings, for in his 'Lapidarium' he places the Chalcedon between the Emerald and the Beryl in colour, but paler, "Chalcedon lapis est hebeti pallore

refulgens;" whilst in his 'Prosa' he makes it a Carbuncle, lustrous by night: "pallensque Chalcedonius ignis habet effigiem." Now, Pliny does in fact mention one kind of Jasper as found at Chalcedon, but all he says of it is that it is cloudy (turbida). Hence it is probable that the "pale" colour, and slight "opalescence," somewhat resembling that of the Fire-Opal, which distinguish that common European stone now known as Calcedony, gave it in the Middle Ages an undisputed title to that name; a transfer to which people were also led by the definition in the 'Prosa' of Marbodus, their great authority. It may, moreover, be conjectured that Pliny's mentioning a "Chalcedonian Jasper" contributed to bring about this interchange of names.

The modern Calcedony is a semi-transparent white quartz (Quartz-Agathe-Calcedoine of Haüy), slightly tinged with yellow or blue. Some of the best specimens of the former kind can hardly be distinguished from the poorer Hungarian Opal, for they exhibit precisely the same milkiness of tint; but their lustre is flamy, not iridescent, and contains no admixture of green. This is the *Girasol* of writers of the last century, but must not be confounded with the Girasol, or Châtoyant Sapphire, Pliny's Asteria. This variety was evidently classed by Pliny amongst the commoner European Opals, which he distinguishes from the incredibly precious and true Indian species. The kind tinged with pale blue, now called the Sapphirine on account of its colour, seems to have been the Jaspis Aërizusa, *i. e.* of a colour *tending* towards the Cerulean: this, adds Pliny, the Greeks term *Boria*, from its resemblance to the sky on an autumnal morning. An apt comparison, which exactly represents the paley-blue tint of a good Sapphirine. A third variety, found in very large masses, was turbid, very opaque, and soapy, sometimes even of a dirty brown. The two last species were abundantly employed by the ancients of every period, but more especially by the Asiatics; the Babylonian cylinders are frequently made of it, and it is the material almost exclusively used for the large conical seals of the Sassanians. The most beautiful Persian cylinder known is in Sapphirine. It bears the usual type of the king fighting against a lion (the evil genius), a design that

proves it to have been the royal signet that graced the wrist of some Artaxerxes or Darius of the later times of the Achæmenian dynasty. Scarabæi of Etruscan work, as well as good Greek and Roman intagli, frequently occur in this material, but engraved on the Sapphirine in preference to any other sort; and justly so, for it is an extremely pretty substance, often approaching to the pale Sapphire in colour, though devoid of its brilliancy. The Girasol is sometimes improperly called the Opaline, hence antique works in it are often described as executed in real Opal, a stone in which (with perhaps a single exception) they never occur. Busts and heads, in full and in bas-relief, and of considerable volume, were executed by the Romans in Calcedony. The most important of these are the Marlborough Medusa in pure Calcedony, in the grandest style, and the bust of Matidia, supported upon a peacock (typifying her deification), and three inches high; a work of the highest merit in point of art, though the material is brownish and turbid. Such monuments afford another proof that this substance was included amongst Pliny's inferior Jaspers: perhaps his Capnias, "stained as it were with smoke," for he goes on to mention a statuette of Nero in armour, 15 inches high, formed out of one stone; and in no other substance do antique works in full relief occur of such magnitude as in Calcedony. Another very grand work, in three-quarters relief and of considerable dimensions, was a head of Augustus, in a style of the utmost perfection, executed in an opaque species much like ivory; perhaps a real Cacholong or impure Opal[1] (Fould Gems). That our two commonest species of the stone were the Leucachates and the Cerachates, White and Wax Agates of the ancients, can hardly admit of a doubt. Dionysius describes the Choaspes as carrying down in his torrents the beautiful

[1] In the Townley Coll., Brit. Mus., is a child's head, of considerable size, admirably carved out of this substance: the resemblance to ivory is most striking. It appears to be the stone described by Pliny (54) as the "Arabica, exactly like ivory, and would pass for it did not its hardness detect it. It is thought to protect the wearers against pains in the sinews (rheumatism)." This appears to be the same as the Thelycardios (68), "so charming by its opaque white colour the Persians (its native locality) that they give it the name of *Mulc* (the King)."

Agates torn by the wintry rains from the mountains, and experience attests the almost exclusive use of the Calcedony for signets by the Persians of his age.

In consequence of the abundance of this stone in Europe, almost the sole fitting material for the Glyptic Art produced by this region in as fine a quality as by the East, a larger number of modern works in relief will be found in Calcedony than in any other stone; whereas genuine antique Camei in this single-coloured material are much rarer than upon the stratified species of the Quartz family. De Boot has (ii. 88), "In our time (in 1609) cups, figures of princes, chaplets of beads, and an infinity of other things are made out of Calcedony. Its chief use is for seals, because the wax (*i. e.* the soft wax then used) does not stick to it."

CHRYSOCOLLA: *Native Verdigris.*

The mineral still known under this name, a carbonate of copper, sometimes opaque, sometimes translucent, and hard as quartz. The ancients obtained the best quality from the copper-mines, an inferior from those of gold. It was also prepared artificially by steeping the ore during the entire winter, and evaporating the liquid by the summer heat (xxxiii. 26). The best came from Armenia, the second quality from Macedonia, but the chief supply was drawn from Spain. It was used in painting, and is reckoned amongst those "florid" colours which on account of their intrinsic value were furnished by the employer, not by the artist. It entered into the list of medicines, as a caustic application for wounds, ulcers, sore eyes; and as an emetic, a very effectual one, but highly dangerous.

But its principal value was as a solder for gold, for which purpose it had been employed from the earliest times, being so mentioned by Theophrastus (26). For this purpose it was steeped in a child's urine, together with verdigris and nitrum, and then rubbed down in a copper mortar with a copper pestle. This solder the Romans called *Santerna.*[1] Gold containing an alloy of silver could be soldered with this, and was all the brighter at the junction; but if alloyed with copper, the gold shrunk up, grew dim, and refused to unite. For such a quality, by adding a seventh part of silver and a little gold to the above ingredients, and grinding them up together, a good solder was produced.

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[1] Either a Punic or Spanish word, as are most of the Roman terms used in metallurgy. Pliny's *nitrum* was our *natron*, native carbonate of soda, the ancient substitute for soap. It is still used as a flux for gold-ore.

The ancient jewellers with this mixture turned out much better work than the modern: the soldering in their fine-gold jewels cannot be detected even by breathing upon it. Castellani, that most skilful reviver of the Etruscan style of jewelry, is forced to confess that the secret of their soldering is totally unattainable. That now used—an alloy of gold, silver, and arsenic—becomes white submitted to this test. The old recipe appears to have been preserved by tradition throughout the Middle Ages, for Cellini gives the ingredients of his gold-solder as: Native Verdigris 6 parts, Salammoniac 1, Borax 1, to be ground in water, and applied to the edges requiring to be joined with a brush, before going to the fire.

Nero, as the patron of the Green Faction, in one of his fits of extravagance, caused the Circus to be strewed with the powder of this valuable mineral, instead of the ordinary sand, on the day when he figured there as a charioteer in a livery of the same dye.

CHRYSOPRASIUS: Χρυσόπρασος.

Pliny's Chrysoprasius is the third kind of his Beryl, approximating to the Chrysoberyllus, but still paler or yellower, and considered by some as belonging to a distinct species. This latter supposition was probably correct, and the stone in question the Indian Chrysolite. Most certainly it was not our Chrysoprase, Silica coloured a beautiful apple-green by oxide of Nickel, slightly translucent, and of uncommon hardness. Had the ancients known this they must have classed it amongst the more opaque Smaragdi: it is more probable they were unacquainted with it, for the only source at present is the mine of Kosemütz in Silesia. Although of much the same composition as the Prase, it differs greatly from that stone in outward appearance, by reason of its opacity and much more agreeable tint of green, besides its greatly superior hardness.

Although antique works do not occur in our Chrysoprase—a necessary consequence, from the fact that the only locality producing it was without the limits of Roman enterprise—yet a mineral much resembling it, though more of a bluish cast, is said to be found sometimes set in old Egyptian jewelry alternately with bits of Lapis-lazuli. Intagli also are known upon this same substance, which has, on account of its colour and slight translucency, been mistaken for the Turquois. This latter kind may with some probability be considered the cerulean Jasper brought from the Thermodon.

Some such stone as this may have been the Omphax, reckoned by Theophrastus (30) amongst the commoner ring-stones. The word, primarily signifying an unripe grape, must have been applied to a gem opaque and green, with a certain bluish bloom upon it. It is strange, indeed, that no Greek intagli are now

extant in any gem at all answering to this description, for Theophrastus puts it in the same list as the Carbuncle, Sard, and Amethyst, whence one would conclude it to have then been equally in general use.

Epiphanius mentions under "Chrysolithus" a variety, the *Chrysopastus*, or gold-spotted. This afterwards came to be confounded with the Chrysoprasius, for Marbodus makes two kinds of the latter—one that of Pliny, called from its resemblance to the leak-leef, the other purple with golden spots. After this he makes a third, the Chrysoprasion, which blazes by night, but resembles a piece of gold in the daytime, applying to it what Pliny (52) says of the Chrysolampis.

At the beginning of this century this beautiful stone was much in fashion, both set round with small brilliants for brooches and rings, and also singly for necklets and bracelets. The paler pieces were coated on the back with verdigris, to heighten their tint. No coloured gems so well became a blonde complexion.

CHRYSOLITHUS: Χρυσόλιθος: *Oriental Topaz.*

THE Chrysolithus of Pliny (42), or at least his best sort, the Indian, was the gem now wrongly styled the Oriental Topaz, a yellow variety of the Sapphire, and of equal hardness and rarity. The ancients obtained it from Ethiopia (a vague term for the remote East), together with the Hyacinthus (Sapphire): a natural companionship, both being Corundum but differently coloured—the blue and yellow *Jacut* (whence Hyacinth) of the Persians. The description, "transparent, with golden lustre," applies to no other gem so exactly as to this. Such is its brilliancy that when De Boot wrote it was considered superior to the Sapphire for imitating the Diamond, after the colour had been extracted by heat. In the first class were placed the Indian, and those brought from Tibara, if not cloudy (turbidæ). The test of their quality was that their intense yellow should make gold compared to it look as pale as silver itself. This golden lustre is a conspicuous quality in the Oriental Topaz, the Brazilian, on the contrary, being betrayed by a vinous tinge. The Arabian Chrysolithi were most probably the modern Jacinths, for Pliny's account of them applies exactly to the latter gem: "They are in least esteem of the whole class, being turbid and of different shades; and even when limpid their lustre is marred by a cloud of spots, as if they were filled up with their own dust" (scobe); an evident allusion to that porousness or granular and even bubbly texture so conspicuous in the Jacinth. Besides, a gem so much in fashion with the ancients as our Jacinth was could not have been omitted from Pliny's list, and here alone is a description to be found at all applicable to it.[1] The same gem

[1] His remark that "they have now gone out of fashion for signet-stones" (tametsi exiere jam de gemmarum usu) supports this view, late Roman

seems also intended by his Melichrysus, "transparent like pure honey shining through gold," an Indian stone, hard yet brittle. Also to the same family belong the Xanthi (orange), "a vulgar gem in that country" (India).

On the other hand, his Pontic Chryselectri, amber-coloured, and recognised by their lightness (the Oriental Topaz being the heaviest of stones), some of them hard and reddish, others soft and cloudy, were no more than Rock-crystals variously tinged with yellow, orange, or brown (Rauch Topaz—Cairn-gorum) Their exact nature is settled by the fact quoted from Bocchus as to the magnitude of one, found in the Crystal-mines in Spain, which weighed twelve pounds; a sufficient proof that he is speaking here of those smoked Crystals, often improperly called European Topazes, which sometimes attain an incredible size: although we must accept with certain reservations De Boot's record of a Bohemian Topaz (presented to his patron Rudolf II.), two ells long by one and a half broad.[2] Yet an elegant shell-formed cup (Renaissance) in this material, large enough to contain a half-pint, has come under my own notice.

Chrysolithi were, when of the first quality, set *à jour* (funda perspicua), almost the sole exception to the then universal custom of backing the stone with gold: the inferior were foiled with *aurichalcum*, a red foil of gold, much alloyed with copper. Transparent gems, when extracted from the remains of their original iron rings, are frequently found backed by a leaf of red gold, of quite a different standard to the pure metal used in the jewelry of the same period. Pliny also mentions the backing of Carbuncles with a silver foil, a method still in use, and the most advantageous when the stone is of fine quality. The use of *coloured* foils is merely to deceive, and to impose upon the unskilful by thus imparting to an inferior gem the finest colour belonging to its own class.

Chrysolithi, whatever they may have been, were in high esteem with the Romans. They are ranked with Emeralds

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work never occurring on the Jacinth, all intagli upon it being either Greek or certainly anterior to Pliny's times.

[2] Meaning the Vienna ell of 27 inches.

by Propertius (II. xvi.) amongst the bribes by which the "wealthy prætor from Illyria," gorged with the plunder of his province, had seduced his Cynthia away from him—

"quoscunque Smaragdos
Quosque dedit flavo lumine Chrysolithos."

This "yellow lustre" of the Crysolithus, coupled with its value, points out the Oriental Topaz as the gem here meant. The Jacinth was much too common a stone then to be mentioned in the same breath as the Emerald, the most precious gem in the Roman jeweller's list.

The Oriental Topaz was formerly much esteemed, and that in comparatively modern times. De Boot puts the value at 2 thalers for the first carat; and after, as the weight squared: Dutens, at a third higher than the Sapphire. The finest on record is that seen by Tavernier in the treasury of Aurungzeb, weighing 157¾ carats, and but recently purchased by that emperor for a sum equal to 11,000*l*. At present their value is little more than nominal, because in wear they are so easily confounded with the common stones of the same colour.

This stone (the Oriental Topaz) was too valuable, and perhaps too hard, for the ancient artists to attack; no genuine works of theirs are therefore to be met with in it.[3] The only yellow gems employed by them were the Jacinth, and occasionally the Cinnamon-stone. From some unexplained cause, the yellow Crystal, though equally abundant in nature with the purple (or Common Amethyst), was very seldom engraved upon by the ancients: genuine works in it being infinitely more unfrequent than in the Jacinth. The best examples known to myself are a head of Julia Titi, an exact replica in miniature of the famous Beryl by Evodus,

[3] Cellini indeed mentions as one of the three finest antiques procured by him during his first visit to Rome (1524–27) a perfect Topaz the size of a big hazel-nut, "una grossa nocciuola," engraved with a head of Minerva; but he probably means by Topaz no more than the bright yellow crystal sometimes used by the Roman artists. Cellini could have known nothing of what now exclusively usurps the name of Topaz, peculiar to Brazil, when a precious stone: for the Portuguese did not begin to settle in that country before 1531. Even at the end of that century the well-informed De Boot knows nothing of the Brazilian Topaz.

and a large double-convex stone of great lustre covered with a Gnostic formula on both faces. Modern engravers, however, have largely turned to account this pretty and easily-worked material, and therefore any intaglio of merit appearing in it must, *primâ facie*, be regarded with the utmost suspicion, nor be admitted as antique, until both the artistic part, and the surface of the gem, have satisfied the closest scrutiny.

Epiphanius says that the Chrysolithus is also called the Chrysophyllus: meaning perhaps either Pliny's Chrysopterus, or more probably his Chrysoberyllus; "a beryl, paler green, which goes off into a golden lustre:" a description applying indeed better to the Indian Chrysolite than to any species of the true Beryl. For Epiphanius states that it is found in the deep quarry or shaft (*φρέατι διπέτρῳ*),[4] near Babylon; and Dion. Periegetes notices as the sole productions of that region its vast palm-groves, and the "Beryl, enclosed in the rocks of Serpentine." Powdered, and taken in drink, it was held a panacea for all complaints of the chest and bowels.

Pliny's Craterites, or "Stone of Strength," of a colour between the Chrysolithus and Amber, and noted for its extremely hard nature, may with reason be supposed only an epithet of the Oriental Topaz.

It would appear that all this class of stones were esteemed in proportion to the depth of orange they possessed, for *yellow* was certainly not a colour admired by the Romans. Pliny notices, speaking of *gold*, that its colour was not esteemed the finest either in *gems* or in other things. This was therefore the reason why their engravers neglected so completely the Yellow Rock-Crystal, whilst the Purple was such a favourite with them.

The mineralogists of the Lower Empire certainly applied the name Chrysolithus in the sense it bears at present. This is deducible from the remark of Epiphanius above quoted: and placed beyond a doubt by the definition of it in Marbodus, as "a stone of a fiery colour mingled with sea-green:" an apt expression for the lustrous Chrysolite. It came from Ethiopia. If set in gold and strung upon hairs plucked out of an ass's tail,

[4] *διπέτρῳ*, perhaps for *διπλεθρῷ*, "200 feet deep."

being worn as a bracelet on the left arm, it drove away demons, and dispelled the terrors of the night.

Marbodus already distinguishes the yellow Corundum as the *Citrinus*, a designation, Citrino, still retained for it by the Italian jewellers, and much more appropriate than the erroneous and arbitrary distinction of Oriental Topaz.

His Citrini, like the two other species of Hyacinthi, protected the wearer from danger in travelling, against pestilential air, and gave them favour with princes.

CORALLIUM: Κουράλλιον: *Coral.*

THE Greek name for this substance was derived according to some (Plin. xxxii. 11) from the necessity of cutting off the plant while still living with a sharp steel (*κουρὰ*, shearing), for if touched by the human hand it instantly hardened. It was considered to be a marine plant, green whilst growing, and producing white and soft berries, which exposed to the air hardened into the colour and the size of cornel-cherries; this latter fact bearing the true stamp of a Greek theory explanatory of the origin of the beads first brought to them by their navigators to Massilia. It is briefly noticed by Theophrastus (38) as being a stone, blood-red in colour, but of a cylindrical form like the root of a plant, and growing in the sea: the petrified Indian Reed (probably the Arabian Coral) not being far removed from it in nature. The ancient notion as to its vegetable nature rested not merely upon its shrub-like form, but also on the fact that its branches are clothed with a fleshy coating, soft whilst in the water, but drying up immediately upon its extraction. The Romans obtained it from the Red Sea, but of too dark a tint to be in much request; from the Persian Gulf, where it was called *Lace;* but the best quality was fished up on the Gallic coast off the Stæchades isles (Hyères); and also off Lipari, and Trapani, in Sicily. The Gauls before the subjugation of their country used it profusely in the decoration of their swords, shields, and helmets (this with amber being the sole ornament known to them in the way of jewels); but when Pliny wrote, the demand for it in India had become so great, that it was rarely to be seen in its native country, all that was in the least saleable being exported to the East. A notice this, by the way, that gives an insight into the vast commerce and the facility of communication

existing at that time between Europe and India. It was as much sought after by the Indians as pearls were by the Romans, and fetched as high a price; the value of such things, as Pliny sagely remarks, being altogether arbitrary (ista, persuasione gentium constant). The beads (baccæ) were as highly prized by the men of the Indians, as the Indian pearls by the Roman ladies. They were worn as a specially sacred amulet, as well as for ornament by their "prophets and diviners" (Brahmins); so they delighted in them both for their beauty and their supernatural virtues.

Every observation of Pliny's respecting the then trade with India is borne out by modern experience, Tavernier remarking that coral was by far the most profitable article that could be taken out to that country. At present a sphere, sound, good-coloured, and weighing an ounce, will command a higher price than any precious stone, either in China or Japan: being in request for the apex to the mandarin's cap of office.

The Romans seem to have employed Coral merely as an amulet and in medicine: the little branches were tied round children's necks to keep off the Evil Eye; and powdered after calcination, it was taken in water for the stone and colic. Being of a cooling and astringent quality, it was an ingredient in salves for obstinate ulcers, for removing scars, and for complaints of the eyes. But Orpheus, who poetically fables it to have originated when the newly-severed Gorgon's head was laid down by Perseus on the sea-weeds, attributes to the Coral a long list of the most extraordinary virtues (570) bestowed upon it by Minerva. It baffled all witchcraft, counteracted poisons, protected from danger of tempests in sea-voyages, and from robbers in land-journeys, and, mixed in powder with the seed-corn, secured the growing crops from damage of thunderstorms, blight, caterpillars, or locusts. These notions were embraced by the mediæval philosophers, as the section on "Coral" in Marbodus proves.

Hence Coral beads are often to be found set in the jewels of the Middle Ages in the same manner as the most precious gems. The small pointed branches mounted with a ring at one end for suspension, so extensively manufactured at Naples, are still in request there as amulets. Ferdinand I. devoutly believed in their

virtue, and frequently pointed this minute defender against the person whose malignant influence (*malocchio*) he suspected. Phalli carved in Coral (the Neapolitan branch being merely their modern representative) are worn yet round the necks of the Roman females as a cure for sterility.

It is not mentioned that the Romans ever employed Coral for glyptic purposes, either in relief or intaglio; although a "Head of Chrysippus in high relief" is quoted as antique in the Catalogue of the Orleans Cabinet. The subject however, as well as the material, makes me suspect that this was rather a work of the Renaissance, when the engravers frequently cut it into Camei, but more especially into statuettes, skilfully availing themselves of the natural disposition of the branches to form the limbs in the attitude required by the design.

In Pliny's alphabetical list of gems (56) occurs the *Corallis* produced in India and Syene, and resembling vermilion in colour. This is an exact description of the antique Red Jasper, which certainly does not appear amongst any of the numerous varieties of the Jasper, properly so called, described by him.

Pliny seems to refer to the passage of Orpheus above quoted, for he has, under "Gorgonia," "This stone is nothing more than Coral, the reason for the name being because it is transformed (from a soft plant) into the hardness of a stone. It appeases the angry seas; it is affirmed that it defends against thunderbolts and whirlwinds."

CRYSTALLUS: Κρύσταλλος: *Rock-Crystal.*

The Crystal (Pure Silica) is reckoned by Theophrastus (30) amongst the stones used in rings, where he speaks of it with the Amethyst, adding "both are transparent." This joint mention shows his knowledge of the true nature of the latter, as being merely an accidentally coloured Crystal. It is curious that, in spite of this inclusion in his list, intagli of the Greek, or indeed of the Roman period, upon Crystal, are unknown to collectors. Herodotus (iii. 24) mentions a stone by the name of ὕαλος, which, if there be any truth at the bottom of his story, must have been Rock-salt, judging from its magnitude and facility in working. "The corpse (of the defunct Ethiopian amongst the Macrobii), after having been dried, whether in the Egyptian or some other manner, is coated with plaster, and painted so as to imitate life, and then put inside of a hollow pillar of *hyalus*, which is dug up there in large quantities, and easily worked; and the corpse, being enclosed within the pillar, shows through it, without producing a stench or anything unpleasant, and wearing all the clothes he used in life."

The Crystal, however, was in enormous request amongst the luxurious Romans under the Empire for the purpose of making drinking-cups, valued as highly as the Murrhina, with which they are generally associated in the allusions of the satirists. An equal mania possessed the fashionable Romans for the acquisition of each sort, the Crystal being appropriated to iced, the other to boiling liquors. Thus Pliny instances a lady, and she not a wealthy one, who had then lately bought a Crystal *trulla* (flat bowl) for a sum equivalent to 1500*l*. of our money. Nero, to revenge himself upon mankind by preventing any one else from drinking out of them, when informed that all was lost,

dashed upon the floor and smashed two Crystal deep bowls (scyphi) engraved with designs from Homer. Seneca tells a story (De Ira, iii. 40) that strongly illustrates their enormous value; that Augustus punished his friend Vedius Pollio, who had ordered a boy who had broken a crystal vase to be thrown into the pond where the lampreys were kept: the culprit, flying to the emperor's feet, petitioned for a less cruel death: Augustus, as a punishment commensurate to the cruelty of the sentence, ordered all the vases of the kind to be broken to pieces in his presence, and the pond to be filled up.

Some idea of the various employments of these materials amongst the Romans, with whom they filled the place now occupied by Sèvres and Dresden porcelain, may be derived from Fauno's account of the articles found in the sarcophagus of Maria Honorii discovered in making excavations at St. Peter's in 1544. "Within a silver box were vases and articles in Crystal, thirty in all, big and little; amongst which were two middling-sized cups, one round, the other oval, engraved with the most beautiful figures in intaglio. Also a snail-shell (or Nautilus) in Crystal, fitted up with fine gold, as a lamp. The gold covered the orifice of the shell, leaving only an opening in the middle for pouring in the oil, by the side of which is fixed on a pivot a golden fly, moving to and fro for the purpose of covering the opening. In the same way the nozzle and hole for the wick are drawn out in a sharp projection with the greatest elegance, and so united with the crystal that it appears all one piece naturally. The cover too is equally well wrought. The shape of the shell is like a large sea-shell (Nautilus) encompassed all round with its points, which in this vessel are polished and very smooth, the crystal being so well worked. There were also vases and different articles in Agate, with certain little animals, eight in all. Amongst these, two very beautiful vases, one like those glass ampullæ made big and squat for holding oil or such like liquid, so wrought, so elegant, so thin, that it is a marvel to behold; the other, in the shape of those brass ladles with long handles used in Rome to bale the water out of cisterns, and supposed to have been a vessel used in sacrifice by the ancients."

These Crystal vases were either embellished with raised

mouldings and gadroons, much after the manner of the modern cut-glass, or, if engraved with designs, these were always in intaglio, the "crystallum inpunctum" of Apuleius. For to all ancient designs in relievo, a contrast of colours was a necessity, to supply a ground for the figures, which would have been lost upon a substance of one transparent, colourless body. Another advantage Pliny notices drawn by the artists from this mode of ornamentation; the sunken work enabled them to cut out or disguise the flaws, and red patches disfiguring the substance.

Many of these vessels were of extraordinary dimensions, though Pliny shelters himself under the authority of Xenocrates for quoting one as large as an amphora (a cubic foot), and another, from India, holding four sextarii (two quarts). But Mohammed Ben Mansur boldly adduces Teifashi telling of a merchant in Mauritania who possessed a basin made out of two pieces of Crystal so large that four men could sit in it at once; and with somewhat more probability, that in the treasury at Ghasna (when captured, A.D. 1159) were found four Crystal vases, each of which would hold two skins of water.

That these vases were partly exported from India ready manufactured, partly carved into more graceful forms at Alexandria (the sole channel through which Indian productions flowed into Europe), appears from the passage in Martial (xii. 74) mentioning Crystal vessels as brought to Ostia by the corn-fleet of the Nile:—

"Dum tibi Niliacus portat Crystalla cataplus."

There is a great similarity in the elegant designs of arabesque foliage covering these bowls with that seen on the cameo-vases in glass of known Alexandrian fabrique, such as the elegant amphora of the Museo Borbonico, surrounded with a network of vine-branches. Thus Achilles Tatius (ii. 3) has "a crater (deep vase), the entire work carved out of one fossil Crystal (in contradistinction to glass), which vine-branches encompass like a garland."

Under the Lower Empire Crystal seems to have been much in use for making solid finger-rings, carved out of one single piece, the face engraved with some intaglio serving for a signet. All those known to me have the shank moulded into a twisted cable; one example bore for device the Christian monogram,

which indicates the date of the fashion. It would seem that these rings superseded and answered the same purpose as the balls of Crystal carried at an earlier period by ladies in their hands for the sake of their refreshing coolness during the summer heats. Thus Propert. (ii. 24 and iv. 3)—

"Et modo pavonis caudæ flabella superbæ,
Et manibus dura frigus habere pila.

. . . . . .

Nam mihi quo Pœnis si purpura fulgeat ostris,
Crystallusque meas ornet aquosa manus?"

"Now courts the breeze with plumes of peacocks fann'd,
Now holds the flinty ball to cool her hand.

. . . . . .

Oh! what avails the purple's Tyrian glare,
Or that my hands the limpid crystal bear?"

Such balls, frequently found amongst ancient remains (Dr. Dee's showstone is one of them), were also used as burning lenses. That they were so employed by surgeons is expressly stated by Pliny:—"I find it asserted by physicians that, when any part of the body requires to be cauterized, it cannot be better done than by means of a Crystal ball held up against the sun's rays." Long before, Aristophanes (Nubes, 758) jocularly introduced the ὕαλος in its capacity of a burning glass as the brilliant invention of Strepsiades for the quashing of a writ:—

"You have noted
A pretty toy, a trinket, in the shops,
Which, being rightly held, produces fire
From things combustible?
Soc. A burning-glass,
Vulgarly called?
Str. You 're right, 'tis so.
Soc. Proceed.
Str. Put now the case: your scoundrel bailiff comes,
Shows me his writ. I, standing thus, d'ye mark me,
In the sun's stream, measuring my distance, guide
My focus to a point upon his writ,
And off it goes in fumo!"

Orpheus (170) recommends such an instrument as the most proper for kindling the sacrificial fire, and ensuring the favour of the gods, the flame thus kindled being called the fire of Vesta.

The largest mass of Crystal ever seen by the Romans was that dedicated in the Capitol by Livia, which weighed fifty pounds. Juba mentions a piece found in the Topaz island of the Red Sea, a cubit in length;[1] and Bocchus described specimens of wonderful magnitude found in Lusitania in the Ammeæ mountains, in shafts sunk down to the level of the water. But the Indian sort was preferred to every other, although that found in the Alps was also esteemed. The latter was extracted from rocks so difficult of access that the miners had to be lowered down to them by ropes, being guided by certain indications known to the experienced as to the stones that would contain the Crystals. Pliny confirms the assertion of Sudines that it was only produced in rocks that faced the south, never in a watery soil, even where the climate is so cold that the rivers freeze to the very bottom. The universal opinion as to its origin, that it was ice-hardened by intense frost (gelu vehementiore concreto), gave its name, the Greek word for ice. Rain, says Pliny, mixed with a small proportion of snow, is necessary to its formation; and hence the substance is unable to bear heat, and can only be used to contain cold liquids.

Pliny (xxxvi. 66) quotes a statement that in India glass was made out of broken Crystal, and hence the incomparable superiority of the Indian glass to any other. Can some faint report of the excellence of the Chinese porcelain have reached the Greek travellers, his usual authorities in this book? for it is certain that glass was unknown in India until imported by the Portuguese; whilst, on the other hand, Chinese porcelain, when first brought to Europe, was considered a species of glass. It is, however, a fact that Crystal, as being the purest Silica, supplies the best possible material for glass-making; hence it was largely used in the manufactories at Murano in the flourishing times of the Venetian glass-trade, and now forms the chief ingredient of Strass, the basis of artificial gems. Theophrastus (49) refers to the same account thus: "For if glass be made, as it is said, out of the Hyalites, this also is produced by condensation." Now

[1] According to the same authority, the "Island of the Dead," off the Arabian coast, also produced it.

the same stone is enumerated apparently by him (30) in the list of signet-gems, where, however, it is distinguished from the Crystal, and termed the Hyaloeides. Now, strangely enough, Garcias ab Horto asserts "that no Crystal at all is found in India, but, on the contrary, the Beryl in large fragments, out of which the natives make both *glass* and vessels of price." The first part of this statement is altogether erroneous, for Crystal is still brought from India, and in masses of enormous size.

Glass had been brought to such perfection when Pliny wrote as to imitate the Crystal with wonderful exactness, yet, strange to say, vases of the latter substance had risen in value, instead of declining through this competition. This colourless, transparent glass, approaching as nearly as possible to the true Crystal, was then the most admired. Such probably was the material of the two small vases with handles (pterotæ), a discovery of Nero's times, that sold for the enormous price of 600 sesterces (60*l*.).

The Indians (xxxvii. 20) had discovered the art of forging all the coloured gems, but more especially the Beryl, by staining Crystal. Treatises were extant, says Pliny (75), directing how to stain Crystal so as to pass for the Emerald and other transparent precious stones; but he declines to point them out, on the ground that even luxury ought to be protected against fraud; adding that no other mode of cheating in the world was so lucrative. Dutens, however (Pierres Précieuses, p. 67), is less scrupulous; stating that a Crystal made red-hot and plunged repeatedly into the tincture of cochineal becomes a Ruby; if into tincture of red santal, it takes a deep red tint; into tincture of saffron, a yellow like the Topaz; into that of Turnesol, it assumes the colour of the Sapphire; into juice of Nerprum, it takes a deep violet like the Amethyst; and into a mixture of tincture of Turnesol and Saffron, it becomes an imitation of the Emerald. Crystal may also be coloured by the dry method by placing the pieces upon orpiment and arsenic mixed together in a crucible, and so exposing them to heat. The cold method consists in steeping the Crystal in oil of turpentine saturated with verdigris, or spirits of wine holding dragon's blood or other coloured resins in solution; the depth of tint produced being proportioned

to the time of steeping. Such false Rubies are still known to the French lapidaries according to Barbot by the name of *Rubaces*. But the substance of the Crystal is not really coloured; it is merely the dye which, insinuating itself into the innumerable minute fissures produced by the sudden cooling, that apparently stains the entire mass; and the great art in the process is so to regulate the heat that these fissures be not too apparent upon the surface of the pretended gem.

It is, however, probable that the ancients employed the more simple method now so much in use, and which produces most of the Carbuncles seen in the London shops, viz., after cutting the Crystal into shape, then to paint the back with the required colour, and so to set it with a backing. The fact that anciently gems were for the most part set in such a manner would greatly favour the execution of this fraud, to baffle which Pliny expressly notices that the better kinds of Jaspers and Chrysolithi were mounted *à jour*, "funda perspicua." Although the Roman jewellers made up the false Sardonyx of three layers by cementing together as many slices of different coloured stones, yet they do not seem to have been acquainted with *Doublets*, that favourite device with the modern trade, in which a thin slice of the true gem, improved by cementing a paste of the proper colour underneath, assumes the appearance of a first-class stone in its kind; or where, the operation being reversed, the paste surface is backed by a facetted Crystal to supply the required lustre. The ancient frauds in the matter of coloured gems went no farther than the above-named staining of the Crystal, and the substitution of pastes for stones. To detect the latter trick, Pliny lays down (76) many rules, some fanciful enough, but amongst them one infallible test, that a splinter of Obsidian will scratch a paste but not a real gem.

To conclude the subject of False Gems, which naturally falls under the head of Crystal, so much employed, either in its natural form, or chemically combined, in their composition, we may insert some of the curious observations of Camillo Leonardo, written before 1502, as to the various forgeries practised by the jewellers of his own times. Many of these are extremely ingenious, and doubtless the recipes had been preserved in the tra-

ditions of the craft from the date of the Empire. Besides making pastes of *smalts*, exact counterfeits of the true gems, they converted the commoner stones into others of the most precious kinds, by such ingenious processes as that of cutting a Garnet very thin and backing it with Crystal to pass for a Ruby; an Amethyst hollowed out and filled with a coloured tincture imitated the Balais, which was also counterfeited by a thin table of the former laid upon a ruby-foil. Diamonds they forged by cutting the Beryl or the White Sapphire to the proper shape (a pyramid), and backing them with the customary tincture. To explain the latter term, it must be borne in mind that formerly the Diamond was always coloured black upon the *culasse*, with a certain composition, on the proper nature of which Cellini treats at great length in his 'Orefeceria,' as being of the utmost importance to the effect of the gem. In order to escape the test of the file, which no paste can endure, these early Italian forgers imitated above all the rest the Emerald and the Peridot, for, these gems being but little superior in hardness to pastes, such a means of detection could not be applied to them.

Although it has been remarked above that no antique intagli in this stone are known to exist, yet there is an epigram by Diodorus (Anth. ix. 776)—"Upon an engraved Crystal."

> "The art and colouring Zeuxis well might claim,
> Yet Satyreius is my author's name,
> Who in the crystal drew Arsinoe's form,
> A faithful image with life's beauty warm:
> An offering to his queen: though small in size,
> No larger work with me in merit vies."

This was an image of Arsinoë "drawn" by Satureius, to which the poet ascribes all the "colouring and the elegance" of Zeuxis, strange expressions for a work in a gem. But the term δαίδαλον[2] applied to it shows that he is speaking of a *statuette*, or

[2] Δαιδαλον properly signifies a work in relief: thus the brooch of Ulysses (Od. xix. 227) is described as παροιθε δε δαιδαλον ηεν, which was a hound seizing a fawn: evidently a repoussé chasing in gold plate, of which so many Etruscan ornaments supply examples. Thus were termed the wooden figures made by the Platæans at the festival of the Dædala, and Pausanias thinks that the old Dædalus got his name from his profession of statuary.

perhaps a bust in full relief, works of which examples are not wanting, the most famous being the Odescalchi bust of Venus, nearly six inches high, in the best antique manner. On the other hand, it was the material in which the chief artists of the early Renaissance executed their most important works. Their intagli were not, like those of the ancients, confined to the small dimensions of signet-stones, but were designed to be worn as medallions, to be set in plate, or to form the panels of reliquaries or caskets (being laid upon a coloured ground), for all which uses extent of surface and transparency were the greatest recommendations. The fame of Valerio, il Vicentino chiefly rests upon his large plaques of Crystal engraved with intagli of numerous figures done in his own peculiar and forcible style, of which numerous specimens, due to his incredible industry through the course of a long life, are everywhere to be seen in collections. The most important of these was the coffer adorned with the History of the Passion, a commission from Clement VII. at the price of 2000 gold scudi, designed for a present to Francis I., on their interview at Marseilles to arrange the marriage of the Dauphin with Catarina dei Medici. Vasari especially commends the Crystals of Gio. del Castel Bolognese, particularizing as his best the Tityus, after the design of M. Angelo, and the Ganymede engraved for the Card. Ippolito dei Medici. Another famous work of his was the Attack on the Castle of Bastia, done for Duke Alfonso of Ferrara. A Lion-hunt by him now in the Devonshire Collection fully justifies the encomium of Vasari. These plaques are usually of considerable size, one in the Uzielli Collection measuring $3\frac{1}{4} \times 2\frac{1}{4}$ inches. Mariette says that the Tityus and the Fall of Phaethon were executed after designs furnished by M. Angelo, and suspects that Perin del Vago supplied those for his scenes from the life of Christ adorning the bases of the Cross, and two candlesticks presented to St. Peter's by the Cardinal Alessandro Farnese, his latest and chief patron.

Smaller intagli of this date in Crystal are sometimes found in jewelry set with the engraved side downwards upon a gold or an azure foil. The effect thus produced is very singular, the designs appearing as though cut in relief upon a transparent gem, a Topaz, or a Sapphire, and the deception so perfect as only to be

detected by the touch. A veiled bust of the Madonna thus treated and set in a ring which lately came under my notice was a remarkable example of this curious illusion, the head appearing in high relief, though upon a really plane surface.

From the very commencement of the Revival, Crystal was employed once more for its ancient destination, the formation of vases in the most elegant and varied forms; as early as the close of the fifteenth century, Camillo Leonardo particularizes this as the sole use of the material. This branch of industry, so eminently artistic in its character, flourished to a vast extent for the two following centuries, as the sight of the older European cabinets fully attests; and its productions, when remarkable for magnitude or skill, commanded then (and even now) the highest prices. The works in Crystal belonging to the Crown of France are valued in the inventory drawn up in 1792 at 1,000,000 francs, comprising vases of numerous different shapes, fifteen candlesticks, statuettes, a Death's Head, &c., and a ball ·165 m. in diameter (6½ inches), valued at 10,000 francs; a galley, ·335 m. (12 inches) long, at 24,000 francs; and a square coffer formed of six plaques, at 4000 francs.

Such objects will find their value augment with the progress of time in the same proportion as their rarity; for in our days this elegant art is entirely extinct. It has been completely driven out of the field by the invention of Strass, of Flint-glass, and of artificial Crystal; substances superior to the natural in colourlessness, purity, and lustre, and only yielding to it in point of hardness. Although the refractive power of the Crystal is but a third of that of the Diamond (being as 10·5 to 30), yet the Cinque-cento jewellers had found a way so to cut it into a pyramid, that, when mounted in the favourite "tower-rings" of that period, it presented the iridescence and much of the lustre of the gem it was designed to counterfeit.

Crystals are sometimes found with a cavity in their substance containing a few drops of water, which moves about as the stone is turned. This is Pliny's Enhydros or Enhygros, "always perfectly spherical, colourless, and polished, but, when moved, something fluctuates about within it like the liquid in an egg." This was regarded by the ancients as a most won-

derful miracle of nature, and an irresistible proof of the correctness of the theory deducing its formation from hardened or solidified ice. Claudian has left several elegant epigrams all turning upon this idea:—

"Pass not the shapeless lump of crystal by,
Nor view the icy mass with careless eye;
All royal pomp its value far exceeds,
And all the pearls the Red Sea's bosom breeds.
This rough and unform'd stone, without a grace,
Midst rarest treasure holds the chiefest place."

"When th' Alpine ice, frost-harden'd into stone,
First braved the sun, and as a jewel shone,
Not *all* its substance could the gem assume—
Some tell-tale drops still linger'd in its womb.
Hence with augmented fame its wonders grow,
And charms the soul the stone's mysterious flow:
Whilst stored within it, from Creation's birth,
The treasured waters add a doubled worth."

"Mark where extended a translucent vein
Of brighter crystal tracks the glittering plain:
No Boreas fierce, no nipping winter, knows
The hidden spring, but ever ebbs and flows:
No frosts congeal it, and no Dog-star dries;
E'en all-consuming Time its youth defies."

"A stream unfetter'd pent in crystal round,
A truant fount by harden'd waters bound:
Mark how the gem with native sources foams!
How the live spring in refluent eddies roams!
How the live rainbow paints the opposing ray,
As with the imprison'd winter fights the day!
Strange nymph! above all Naiads' fame supreme—
Gem, yet no gem—a stone, yet flowing stream!"

"Erst while the boy, pleased with its polish clear,
With gentle finger twirl'd the icy sphere,
He mark'd the drops pent in its stony hold,
Spared by the rigour of the wintry cold.
With thirsty lips the unmoisten'd ball he tries,
And the loved draught with fruitless kisses plies."

"Streams which a stream in kindred prison chain,
Which water were, and water still remain,
What art hath bound ye, by what wondrous force
Hath ice to stone congeal'd the limpid source?
What heat the captive saves from winter hoar,
Or what warm zephyr thaws the frozen core?
Say in what hid recess of inmost earth,
Prison of floating tides, thou hadst thy birth?
What power thy substance fix'd by icy spell,
Then loosed the prisoner in his lucid cell?"

It equally excited the admiration of the mediæval philosopher, Marbodus devoting a separate section to a description of the mystery which he owns himself unable to explain. It is the modern opinion, however, that the liquid, instead of being imprisoned in its "lucid dungeon" at the time of the Crystal's formation, and being the residuum of its subject-matter, has rather subsequently infiltrated into the cavity through the pores of the stone. It is said that the miners in California often come upon huge quartz-nodules filled with water, and are poisoned occasionally by drinking it, from the quantity of silica it holds in solution.

Such Enhydrous Crystals are not unfrequently to be met with in jewels of the Cinque-cento. They are somewhat dangerous ornaments, sometimes exploding with great violence on the sudden application of heat, an instance of which is on record when a person had his palate severely lacerated by placing one in his mouth; and Barbot mentions a similar explosion happening within his knowledge on a jeweller's soldering a ring set with such a "pregnant gem."

The ancients do not appear to have attached any medicinal virtue to the Crystal—Orpheus, the prime source of all such notions, only recommending it as a burning lens for sacrificial purposes; but Marbodus, on the authority of Evax, prescribes the powder of it to be taken in *mulsum* (wine and honey) by women suckling as a sure means for increasing their supply of milk.

In addition to all these wonders, the Crystal played an important part in magic. A sphere, some three inches in diameter, apparently one of that ancient sort already described, was the far-famed "show-stone" of Dr. Dee, wherein that "egregious

wizard" conjured up for those who consulted him a picture of their coming fates, after the manner yet practised by the Cairoen magicians, who, however, substitute for the sphere a pool of ink held in the palm of a boy's hand. This magic mirror may be seen preserved in the class of Crystals (quartz) in the British Museum. Dr. Dee had very ancient authority for such a mode of foreshowing the future, for Marbodus thus transcribes the precepts of some antique *magus*, though giving the *diadochus* (simply mentioned by Pliny as resembling the beryl) for the Crystal :—

"If e'er thou seek, where deep the rivers flow,
To force the water-sprites the fates to show,
Take the *diadochus* upon thine hand;
No gem more potent o'er the fiendish band.
Within its orb to thine affrighted eyes
Shall myriad shapes of summon'd demons rise.
But mark! if brought in contact with a corse,
Forthwith the gem shall lose its native force.
Like to the beryl shows the wondrous stone,
That dreads the touch of one by death o'erthrown."

CYANUS: Κυανὸς: *Lazulite.*

It has been asserted positively by some modern mineralogists, adopting the conjecture of De Bòot, that Pliny's Cyanos was our Sapphire; an opinion, however, by no means borne out by his description of the former stone. "The Cyanos shall be described separately, a favour granted to the blue colour lately mentioned (*i. e.* when speaking of the Blue Jasper). The best sort is the Scythian, then the Cyprian, and last of all the Egyptian. It is very largely imitated by staining crystal, and a certain king of Egypt has the credit of having first discovered how to tinge crystal of this colour. This stone also is divided into the male and female kind. Sometimes there is gold-dust seen within it, but differently from that in the Sapphirus: for in the latter the gold shines in points or specks amidst the azure."

Pliny appears to have written the above, not from a knowledge of the actual stone, as then known by that name to the Roman lapidaries, but merely as a translation, somewhat inaccurate, of the words of Theophrastus (55):—"And as there is a Red Ochre both natural and artificial, so is there a Cyanos, also both produced naturally and made by art, like that manufactured in Egypt. Of this Cyanos there are three kinds: the Egyptian, the Cyprian, and a third the Scythian. The Egyptian is the best for thick-bodied paints, but the Scythian for those of a diluted kind. The Egyptian is produced artificially, and the writers of the history of their kings record this also, which of the kings it was who made a fused Cyanos in imitation of the natural stone; and that this mineral used to be sent as a present from other countries. From Phœnicia, however, it was brought as an appointed tribute, a fixed quantity of Cyanos, so much in the native state, and so much ready calcined. The persons who

grind up paints say that the Cyanos produces from itself four different shades of colour: the first made from the thinnest pieces being the palest, the second from the thickest giving the darkest tint."

Hence it is evident that Theophrastus is describing some mineral used merely as a paint, and not as a precious stone,[1] and that his Cyanos was but an inferior Lapis-lazuli, like that we see in antique Egyptian jewelry, or rather a Lazulite prepared by calcination for the painter's use, that is converted into ultramarine. Or it may have been Sulphate of Copper in bright-blue crystals (Cyanose): which is nearly transparent in its native state, and of considerable hardness: or something of the nature of the Lapis Armenius (Berg-blau) noticed by Tavernier as employed in Persia in his own times as a cheap substitute for ultramarine. The gold-dust, however, noticed by Pliny as occurring upon its surface, though but occasionally, would again lead to the conclusion that it was a variety of the Lapis-lazuli, pieces of which sometimes are found entirely free from the specks of Pyrites. Pliny, understanding Theophrastus to be describing a precious stone, has mistaken his meaning as to the discovery of the Egyptian king, and has rendered his "fused Cyanos" by a "stained crystal," that being the common method, learnt from the Indians, of forging the transparent precious stones in the age of Pliny. This mention of crystal, and the idea consequently involved of the imitation of a blue, transparent, lustrous gem, all based upon a mistranslation, was the sole foundation for the belief that the Cyanos could be the modern Sapphire, which the whole tenor of the statement of Theophrastus proves conclusively it was *not*.

The artificial Cyanos is the blue enamel so universally used by the old Egyptians for glazing all their works in terra-cotta, in imitation of the more sumptuous articles in the then so precious Lapis-lazuli. Davy found that the Egyptian azure, employed in fresco-painting, could be exactly and cheaply pro-

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[1] The *Sapphirus*, or Lapis-lazuli, is treated of in the first division of his book, containing Stones and Gems; but the *Cyanos* comes in the second, treating of earths used in the arts.

duced by fusing together during two hours 15 parts carbonate of soda, 20 powdered flint, and 3 of copper-filings, yielding thus the true artificial Cyanos of the Greek mineralogist.

There can be no doubt that the Cyanos of the earlier Greeks was the mineral known to Pliny as *Armenium:* both names being mere epithets, the first denoting its colour (blue), the second its native country. "Armenia supplies the paint called by its own name. It is a stone coloured like the Chrysocolla, and the best quality, that which approximates nearest to that mineral, yet sharing that colour with a sky-blue. It is usually priced at 12 denarii per pound. That found in Spain is in the form of sand, but is prepared for use in the same manner. The cheapness of this brings it down to 6 denarii. It differs from Azure (Cæruleum) by reason of a slight tinge of whiteness, which renders this colour more soft. Its sole use in medicine is for promoting the growth of hair, especially of the eyelashes" (xxxv. 28).

But by a curious oversight Pliny has (xxxiii. 57) applied the exact words of the same chapter of Theophrastus describing the Cyanos to his *paint*, Cæruleum, for, after stating that it is found in silver-mines in the form of sand, he adds: "*Of old times* there were three kinds of it,—the Egyptian the most esteemed; the Scythian; this is easily dissolved, and in grinding up divides itself into four shades — a lighter, a darker, a thicker and a thinner —to the latter the Cyprian is even now preferred. To these are now added the Spanish, and that from Puteoli, for they have begun to manufacture it in those places. It is all, however, stained and boiled with a peculiar plant until it imbibes the colour: afterwards it is treated like the Chrysocolla. The test of the purity of Cæruleum is for it to blaze if thrown upon hot coals; the false kind is made by mixing the water in which dried violets have been boiled with Eretrian chalk. The effect of Cæruleum in medicine is to cleanse ulcers, on which account it enters into the composition of certain ointments." All which notices go to prove that the base of the several blues of the Romans was Sulphate of Copper under various forms.

GAGATES: Γαγάτης: *Jet.*

This stone (or rather fossil wood) derived its ancient name from the river Gages in Lycia, where it was first discovered; it was also said to be picked up on the coast of Leucolla over an extent of 12 furlongs, where it had been cast up by the waves. The Romans chiefly valued it for its medicinal qualities, some of them very wonderful, for the fumes of it when burning would discover any one subject to epilepsy by immediately inducing a fit: and the water in which it was steeped proved by its effect an infallible ordeal of female chastity. Its fumes also drove away all reptiles, and were good against the strangulation of the womb. Its flames, though quickened by water, were quenched by the application of oil. Anything written with it upon pottery could not be obliterated. Mixed with wine it was good for the toothache; and with beeswax, a sovereign ointment for tumours. But strangest virtue of all was that for which the Magi employed it in the mode of divination called *Axinomantia*, for it would not consume if the desire of the consulting party was destined to be accomplished. The same virtues are set forth by Orpheus (468), who indeed appears to have been Pliny's authority on this article. Marbodus notices the electricity it acquires by friction, and the fact that the British kind was of equally good quality with the Lycian. This electricity procured for it in the Middle Ages the title of Black Amber; in fact, it often occurs in the same beds of Lignite as the real Amber, and is probably the fossilised branches of the same tree that produced the resin, the origin of the latter. When the Roman traders brought back the tale of the natives on the Baltic coast employing amber for fuel, ignorant of its value, it is allowable for us to modify the statement,

and interpret their report as relating to the use of coarse Jet or Kimmeridge Coal, a similar substance, for such a purpose.

It was, however, turned by the lathe into ornaments by the Britons, perhaps even before the Romans subjugated this island, since large rings turned out of solid pieces, for bracelets and anklets, are often discovered amongst British remains. The round disks, cut out from the centre of these rings, the refuse of the turner, often found in heaps together in Dorsetshire, long puzzled antiquaries, who agreed to call them "Kimmeridge Coal-money," and to regard them as a primitive currency. Their true origin has been but lately ascertained.

The Romans, however, learnt from their subjects how to convert this elegant material into articles of decoration stamped with their own more refined taste; most interesting examples of which were discovered in two stone coffins found at some depth beneath the principal entrance of S. Gereon, at Cologne, during the repairs going on there in 1846. These are conjectured to have been a complete set of ornaments belonging to a priestess of Cybele, and consist of two hair-bodkins, with heads formed out of pine-cones, almonds, and trefoils, bracelets, rings, a half-crotalon with a Medusa's head upon it,—in all 26 articles.

The intagli in Jet however, antique and mediæval, palmed off in such quantities of late years upon English antiquaries, are nothing but impudent modern forgeries, with no ancient precedents.

It is not altogether foreign from this subject to adduce a fact of which few are aware, that the use of *Coal* for fuel can be traced back to the early times of Greece. Theophrastus, treating of the Anthrax (16), has: "But those which are properly named *Coals*, on account of the use made of them by the luxurious, ignite and burn exactly like charcoal. They are found in Liguria in the same region as the Amber; and also in the territory of Elis, on the mountain-road to Olympia; and these are used by the blacksmiths for fuel."

HELIOTROPIUM: *Heliotrope.*

This stone retains its ancient name, and is a Prase, or semi-transparent, green Calcedony, interspersed with small patches of opaque, bright red Jasper. It is Pliny's variety of the Prasius, which "sanguineis punctis obhorret." India then, as now, furnished this beautiful stone, the best specimens of which present a pleasing combination of an emerald green nearly transparent, and of the most vivid red.

This must be distinguished from the Bloodstone, often improperly called Heliotrope, the latter being a green Jasper, perfectly opaque as to both its constituent colours, and a much commoner material; found also in many parts of Europe.

The origin of the name (Sun-turner) is thus given by Pliny (60): "The Heliotrope produced in Ethiopia, Africa, and Cyprus, is of the colour of the leek (as the *Prasius*), and marked with veins of blood. The reason of its name is, because, if thrown into a pot of water, it (especially the Ethiopian kind) transforms the sun's light falling upon it into the reflection, as it were, of blood (sanguineo repercussu). The same stone, out of the water, acts as a mirror for observing and detecting solar eclipses, and showing the moon passing over his disk."

This last notice is very curious, referring as it does to the method resorted to by the old astronomers for making solar observations; for, it must be borne in mind that the chief authorities upon the properties of Gems, quoted by Pliny in his alphabetical list, were the Magi, the fathers of astronomy. It is difficult, however, to conceive how a tablet of Heliotrope could be used as a mirror; but, on the other hand, a thin slice of a green transparent stone would admirably protect the eye of an observer looking *through it.* Perhaps here, as in the case of Nero's emerald, there may be a confusion of the two ideas, between the looking into a reflector, and the looking through a transparent medium.

Pliny quotes, as a most glaring example of the impudence of the Magi, their assertion that the wearer of this gem coupled with the plant of the same name, by the aid of certain spells known to them, was enabled to become invisible. The Hephæstitis found at Corinth, though *fiery red* in colour, might similarly be used as a mirror: the test of its genuineness was—if boiling water became cold immediately upon its being thrown in, or if, when placed in the sun, it immediately kindled dry fuel. It is impossible to divine what stone is here intended; Orpheus, however (264), ascribes exactly the same properties to his Lychnis. Hephæstitis, "Vulcan's-gem," may therefore be only an epithet for the same stone, or for the Carbuncle, which the designation of "rutila" will perfectly suit.

Marbodus adds to the other powers of the Heliotrope that of bringing together clouds and of evoking tempests (see p. 52).

This material was very little employed in ancient art, in spite of its beauty; the irregular dissemination of its colours altogether destroying the effect of any intaglio cut upon it. For (except in the case of the banded Agate) it was a necessity with the ancient engraver that the field of his design should be of one uniform colour. A Mercury, and a small figure of Sol, in a later Roman style, are the only examples of really antique work on Heliotrope within my knowledge; and here probably the material was chosen from superstitious motives as bearing a name (in the latter case) analogous to the subject upon it.

HYACINTHUS: Ὑάκινθος: *Sapphire: Precious Corundum.*

Of no ancient gem has the attribution of the name been so much disputed as of this. The earlier writers, De Boot and De Laet, put it down without hesitation as a variety of the common Amethyst; Millin and K. O. Müller regard it as the pale sort, the latter asserting that the name "Amethystus" only applied to the dark purple stone. Bruckmann thinks it was either a pale amethyst, or a garnet tinged with violet (Almandine). Lessing, on the other hand, defines it as a reddish-brown fiery stone, the present dark Jacinth. All these explanations are based upon an exclusive consideration of the passage in Pliny (xxxvii. 40) containing a brief and vague description of the gem; for, curiously enough, it is not included in Theophrastus' list of ring-stones; perhaps in his age it had not yet found its way into Greece from the remotest part of India. Pliny's words are, "that it differs greatly from the Amethyst, although a variety of a similar colour (tamen e vicino descendens). The difference consists in this, that the violet splendour of the Amethyst is diluted in this stone, and, so far from filling the eye, does not even touch it, fading away more speedily than the flower of the same name." But what this flower was is equally a matter of dispute amongst botanists as is the nature of the gem amongst mineralogists. Pliny (xxi. 97) describes it as a bulbous plant, growing abundantly in Gaul, and used by the natives to dye blue or lilac with (hysginum). Its juice had the singular property of checking the development of puberty in boys. Sprengel defines it to be the common gladiolus; others, the tiger-lily; others, the lark-spur: it would rather seem to have been the blue fleur-de-lys, the blossom of which lasts but a morning, to

judge from Ovid's elegant lines upon its springing from the blood of the youth Hyacinthus :—

> "Flos oritur formamque capit quam lilia, si non
> Purpureus color hic, argenteus esset in illis."

Visconti actually figures a statue of Hyacinthus holding in his hand, as an identifying symbol, a fleur-de-lys. This flower also exhibits on its petals (which the gladiolus does not) Apollo's cry of grief, AI, AI, mentioned as its great characteristic by Ovid, and by Pliny.

Pliny evidently believed that the gem derived its name from its resemblance to the flower in colour; but there is as little foundation for this as for most other similar ancient etymologies. The Indian name of the stone, of which the Arabic *Jacut* preserves the sound, was readily assimilated by the poetical Greeks to that of Apollo's favourite Hyacinthus, or Hyacis—the more especially as there is some ground for believing that the gem (at least in Roman times) was held sacred to the Sun. The identity of names between Apollo's darling and the gem produced the epigram (Anth. ix. 751):

> Α σφραγὶς ὑάκινθος, Ἀπόλλων δ' ἐστὶν ἐν αὐτῇ
> Καὶ Δάφνη. ποτέρου μᾶλλον ὁ Λητοΐδας.

But that the Hyacinthus of the ancients is the Sapphire of the moderns will be perfectly evident to any mineralogist who will carefully peruse the minute description of the same gem given by Solinus: "Amongst those things (in Ethiopia) of which we have treated, is found also the Hyacinthus, of a shining sky-blue colour: a stone of price, if it be found without blemish; for it is extremely subject to defects. For generally it is either diluted with violet or clouded with dark shades, or else melts away into a watery hue with too much whiteness. The best colour of the stone is an equable one, neither dulled by too deep a dye, nor too clear with excessive transparency, but which draws a sweetly-coloured tint (florem) from the double mixture of brightness and violet (purpura). This is the gem that feels the influence of the air, and sympathises with the heavens, and does not shine equally if the sky be cloudy or bright. Besides,

when put in the mouth, it is colder than other stones. For engraving upon, indeed, it is by no means adapted, inasmuch as it defies all grinding (attritum respuat): it is not, however, entirely invincible, since it is engraved upon and cut into shape (scribitur et figuratur) by means of the diamond." In the preceding passage Solinus has noticed the production of cinnamon in the same district, which, as the native country of that spice, must have lain very far south in the Indian Ocean. "Æthiopia" and "India" are frequently used indiscriminately by the writers of the Decline; thus Heliodorus talks of the gymnosophists, bamboos, and amethysts of the former country—things all peculiar to the latter.

Three characters in the above passage apply to our Sapphire, and to no other gem; the lustrous sky-blue colour, its liability to be clouded with shades of indigo or with watery blue, and its pre-eminent hardness—the last quality, indeed, being possessed by it in the next degree to the Diamond. Pliny's account of the Hyacinthus, already quoted, agrees in the main with the above, though his description of the gem is far from being so explicit as that of Solinus, who was evidently a connoisseur in precious stones, and throughout the whole of his compilation has successfully laboured to rectify and elucidate the somewhat loose and confused language of the great naturalist. Solinus, to judge from his style and certain historical allusions, flourished two centuries after Pliny, when the vast commercial intercourse with India established in the reign of Trajan had made the Romans much better acquainted with the more peculiarly Indian gems. For then, as in our day, real Sapphires came from Ceylon exclusively; those so often quoted as to be found at Expailly in France being, according to Barbot, nothing more than blue crystals of Quartz. The ancient Indians obtained their Hyacinthi out of the beds of torrents, just as the Cingalese do their Sapphires to this day, for the gem never occurs in the matrix, but in rolled pieces mingled with the gravel. This peculiarity of their origin is elegantly alluded to by Naumachius (v. 58), where, speaking of the "purple Hyacinth and the green Jasper, in which the foolish glory," he adds, "they are but stones upon the

pebbly beach of the sea, and cast in numbers at random upon the banks of torrents."

> "Dote not on gold; nor round thy neck so fair
> The purple hyacinth or green jasper wear:
> For gold and silver are but dust and earth,
> And gems themselves can boast no real worth:
> Stones are they scatter'd o'er the pebbly coast,
> Or on the torrent's banks at random toss'd."

Some of the varieties of Pliny's Adamas were indubitably grey or pale Sapphires, to judge from his description of their distinctive characters. The steel colour and great weight which he assigns to the Siderites prove this to demonstration; for no other terms could so exactly express the tint of the unpolished paler Sapphire, or its unparalleled density; for its specific gravity is actually one degree greater than that of the Diamond. The "aëreus color" also of his Adamas Cyprius is the sky-blue of our finest Sapphire, its hue being the exact shade of the "air" or pure heaven in the climate of Rome:—

> "Acris ecce color tunc cum sine nubibus aer."—Ovid, *A. A.* iii. 174.

Again, Epiphanius twice repeats the epithet ἀέριος applied to the "Adamas," worn, according to his version, by the High-Priest *over* the Rationale, and itself constituting the δήλωσις, or Urim and Thummim, the "Manifestation of God's Will," signified by the changes of its colour: and be it remembered that Epiphanius was a *Cyprian* bishop. Pliny also states of this species, that, besides having this blue tinge, it could be perforated by means of another diamond, *i.e.* of the true Indian sort, to which alone the Sapphire yields in hardness. The modern name Sapphire is a mere epithet expressive of its colour: the ancient Sapphirus or Lapis-lazuli furnishing the paint ultramarine, sapphirinus came to signify "azure," exactly as "Nilaa," the present Indian name of our Sapphire, does.[1] We find the blue species of

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[1] In Pliny's list of *green* gems stands actually a "*Nilion* found in India, of a tint dull and so faint as to disappear on a close examination; somewhat resembling a smoky Peridot, or sometimes of a yellowish cast." A bad Sapphire doubtless: where the pale blue goes off into a dirty green; a common defect. Or it may have been the *Sappare*, composed of silica and alumina in

the Precious Corundum already at the close of the fifteenth century designated "Sapphirini" by Camillo Leonardo in his 'Speculum Lapidum,' to distinguish them from the red and yellow varieties of the same class, the Ruby and Oriental Topaz.

The Hyacinthus of the Romans is invariably blue and lustrous; even Isidorus, in the sixth century, contenting himself with an abridgment of the already quoted passage of Solinus. Thus we find Martianus Capella speaking of the "fluctícolor profunditas Hyacinthi," the dark violet of the Mediterranean before a storm—

"ὡς δ' ὅτε πορφύρῃ πέλαγος μέγα κύματι κωφῷ"—Il. xiv. 16—

or the billows shining, as Catullus hath it, "purpurea a luce." So Heliodorus (Æth. ii. 30) extols the Hyacinthi in the necklace of Queen Persine, "as imitating the colour of the shallow sea, under a steep rock, quivering gently, and tinging with violet the bottom." Hence appears also the appropriateness of the favourite epithet *ὑακίνθιναι* as applied to the flowing hair of southern beauty, the black of which exactly represents the violet reflex of the raven's plumage. In the panegyric upon an imperial bride found by Mai in a MS. of Symmachus and of the same date (fifth century), the rhetorician describes the "Hyacinthi *tetra* luce vibrantes, quum luminibus claris mixtæ cernuntur emicare nigredines." The "gloomy lustre" and "mingled blackness," or deep violet, aptly illustrate the preceding remarks.

Epiphanius, however (A.D. 400), notices some other important varieties of this gem.[2] He divides the Hyacinthus into five sorts, because the deeper in colour the greater the value of the gem, inasmuch as the Hyacinthus, like dyed wool, displayed various shades of purple. The first quality was called Thalassites, or Marine (*i.e.* deep blue, according to the analogy of *Venetus* and *ultra-marine*); the second, the Rose-coloured; the

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nearly equal proportions, in colour a Prussian blue, fading off into grey or green, which Barbot says is still sent into the market from India, cut and polished, for a variety of the Sapphire. Besides the difference in its blue, it is much softer than the Corundum.

[2] He ventures a conjecture that the "Ligure" of the LXX. must be the Hyacinthus, because in their list of precious stones (in the Rationale) they have made no mention of the latter, though both a beautiful and a valuable gem.

third, Nativus; the fourth, Chaniæus; the fifth, the Pale. All came from the interior of Scythia, and possessed the property of not merely being uninjured by fire, but even of extinguishing it when thrown in, and, moreover, of rendering incombustible the linen in which they might be wrapped. In this list the third name, "Nativus" discloses a curious fact, for De Laet quotes Zosimus Panopolitanus to the effect that "Natef" is the Arabic for φοινικοπάστελλος, "a cake of vermilion paint." Hence it is evident that Epiphanius had derived his information on this point from some Oriental source, whence his more accurate acquaintance with its varieties, like the Ruby, differing indeed in colour, but of identically the same chemical constitution. Still more strange is it to find Marbodus in the eleventh century venturing here to leave his usual guide, Isidorus, and, following the example of Epiphanius, but with still greater accuracy, to make the three divisions above alluded to, the blue, the red, and the yellow; and with an exactness of arrangement most surprising at that early period, referring them all to the same genus—the actual modern classification.

On account of its extreme hardness the ancients for the most part employed the Sapphire as a mere ornamental stone for setting in their jewelry, unengraved and unshaped; contenting themselves with giving a tolerable polish to the native irregular surface of the pebble. They appear thus in the barbaric imitations of later Imperial pomp that have come down to our times: in the Lombard crown of King Agilulph; in the Iron Crown of Monza, the gift of Queen Theodelinda; in that of Hungary made by the order of Michael Ducas as a present for Geisa in 1072; and above all, in the magnificent crowns of the Gothic princes Reccesvinthus, Sonnica, and his nobles lately discovered at Fuente de Guarrazar, near Toledo. Claudian enumerates amongst the treasures of the Emperor Theodosius—

> "viridesque smaragdo
> Loricas, galeasque renidentes hyacinthis."

Amongst the Rutupine antiquities preserved in the library of Trinity College, Cambridge, is a portion of a necklace of small rough Sapphires drilled at each end and linked together with

gold wire, the exact ornament referred to by the poet Naumachius.

Previous to the Imperial epoch, engravings in Sapphire are of the rarest possible occurrence. A small Etruscan scarab, however, on an inferior variety has recently come under my notice, and also a magnificent head of Jupiter inscribed ΠΥ, executed in the purest Greek style. This latter had been discovered as ornamenting the pommel of a Turkish dagger, the intaglio turned downwards, and the back of the stone rudely facetted by the Oriental lapidary into whose hands this precious monument had fallen, an additional proof of its genuine antiquity. This stone was one inch in diameter. Even superior to this as a work of art, and belonging to the same school, is the Medusa's Head in nearly full face, one of the chief glories of the Marlborough Collection, of the most exquisitely finished execution combined with the utmost vigour, and which would render valuable even an ordinary material, but greatly enhanced here by the fine quality of the Sapphire, cærulean and clear. Another of much larger size (⅞ in. high) in the same collection, on a stone of much deeper azure, though streaked with lighter shades, bears the head of Caracalla, as good a work in point of art as his times could produce, but in which the peculiar execution bears testimony to the difficulties of the task, the hair being made out by a series of drill-holes set close together to express the short curly locks of the irascible tyrant. A singular vitreous polish has been given to the interior of the intaglio, the infallible characteristic of all really antique work in gems of uncommon hardness. But the most famous of all is the Signet of Constantius II. (now in the Rinuccini Collection), on a perfect stone[3] weighing fifty-three carats. The Emperor is represented as spearing a monstrous wild boar, designated thereon ΞΙΦΙΑC (from his sword-like tusks), before a reclining female figure personifying "Cæsarea of Cappadocia," the scene of the exploit. The inscription CONSTANTIVS AVG in the field manifests that this costly stone had been engraved for the actual signet of the imperial hunter. There is now in London a unique

[3] This gem has been long known: Ducange first published it.

work *in relief* in the same material, the well-known design of Hebe feeding the Eagle; the stone, heartshaped and of fine colour, $1\frac{1}{4} \times 1\frac{1}{4}$ inches in dimension. The work, apparently belonging to the times of Hadrian, is of considerable merit, though producing but little effect, from the clouded surface of the gem upon which such admirable skill and patience have been lavished, a circumstance of itself attesting the date of its execution. The stone has a hole drilled through its longer axis, evidently done in India, that it might be worn as a bead, before it was purchased by the Roman lapidary, to be engraved as a cameo; for the work in one place has cut down into this perforation.

Of modern works, the finest ever done is the portrait of Pope Paul III., ascribed, no doubt with justice, to the famous Alessandro Cesati, in the Pulsky Collection. It is a beautiful Sapphire $\frac{3}{4}$ inch square, a truly inestimable gem, both for its fine quality and the spirit and life of the engraving, and was certainly the signet of the Pontiff himself. Inferior to this in point of art was the bust of Henri IV. by Caldoré (with his initials) on a large octagonal stone of pale colour, but possessing great historical interest. A large number of pale Sapphires may be seen in cabinets, engraved with heads or figures, usually but poorly done, in the style of the Cinque-cento. The reason is explained by De Laet (i. 7):—"The sort which is pale, or watery, is painted on the back with indigo, so as to imitate the sky-blue and superior kind, although this method is forbidden to jewellers to employ unless there be something engraved upon the stone, in order that its quality may be distinguished."

The pale Sapphires can be rendered entirely colourless by exposure for some hours to a regulated heat, and thereby acquire great brilliancy, so as often to be passed off as real Diamonds. But there is one infallible distinction between this uncoloured gem, and also between the White Topaz, and the true Diamond, that neither possesses the iridescence always displayed by the latter when catching the light at a certain angle.[4]

[4] The Cinque-cento jewellers, however, had the art of cutting the pyramidal crystals, so often set by them in their "tower" rings instead of the diamond, so as to obtain to a certain degree this rainbow-play of colours.

The engravings on Diamond really done by Birago, Jacopo da Trezzo, and other artists of the Renaissance, were often imitated by others either upon this material or the White Topaz. De Boot states (ii. 32) that he had seen an Oriental Amethyst (*i.e.* a purple Sapphire) treated in this way, valued by the Imperial jeweller at 200 thalers, in consequence of its possessing the true water of the Diamond, and which could not be distinguished from a true one of the same size and shape that had cost 18,000 gold pieces.

In this class of gems the subject-matter, the Precious Corundum, is extremely capricious in the colours it assumes, from the various natural influences that may have unequally affected the Crystal during its formation: sometimes the same piece will be blue and red at opposite ends, each portion quite distinct; sometimes they run into each other, producing a lilac in their junction; at other times the two combine, yet separate when viewed at different angles, so that the same piece is in one light blue, in another lilac; or, again, the deepest indigo and perfect whiteness are found in the same Crystal, and so on. A curious variety occurs when the Crystal is made up of concentric layers, like the coats of an onion; such a gem, when polished, is opalescent, and if skilfully cut, with proper attention to the arrangement of the layers, will present a beautiful star with delicate silky rays regularly divergent from one centre. This was in all probability Pliny's Asteria. (ASTERIA.)

The remarkable coldness of the Sapphire to the touch, due to its great density, gave rise to the notion recorded by Epiphanius of its power to extinguish fire, or natural antagonism to heat. This was improved upon by mediæval credulity into the doctrine that "the Sapphire worn in a ring or in any other manner is able to quench concupiscence, and for that reason is proper to be worn by the priesthood, and by all persons vowed to perpetual chastity." (Vossius, De Phys. Christ. vi. 7.) And furthermore, "the Sapphire is said to grow dull if worn by an adulterer or lascivious person." Hence its adoption to adorn the episcopal ring of office from the commencement of the Middle Ages down to the present time: the ring of the Abbot of Folleville, the oldest ecclesiastical jewel extant, is set with a large native Sapphire.

JASPIS: Ἰασπις.

GREENNESS and more or less translucency were the two essential characters of the ancient Jaspis (Plin. xxxvii. 37). Epiphanius has: "The Sixth Stone, a Jasper; this in appearance resembles the Emerald, like which it is green, but duller and more obscure, and having its substance green inside, resembling verdigris. There is another sort, greener than the sea, deeper in colour and in degree," &c. Hence Orpheus (264) terms it "the Jasper, colour of Spring." The first of the four kinds into which Dioscorides divides it is "that like Emerald." The exact stone intended by this definition is pointed out with the utmost exactness by Pliny's notice that the sort like an Emerald, surrounded by an opaque white line, and hence called Grammatias, or Polygrammos, if having several such lines, were worn as amulets in the East. Or, as Epiphanius explains it: "That with four veins, we have heard, is good to keep off spectres; at least so say the magicians." This verdant colour furnished the idea to King Polemo for the pretty epigram[1] (Anth. ix. 746) "Upon a herd of cattle engraved in a green Jasper," where they all seem alive, and are confined within a golden fold to prevent their straying beyond the verdant mead. And another (ix. 750): "If

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[1] Επτα βοων σφραγιδα βραχυς λιθος
εἰχεν Ιασπις
ως μιαν ως πασας εμπνοα δερκομεναϛ
Και ταχα κεν απετρεψε τα βοιδια,
νυν δε κεκλειται
εν χρυσῃ μανδρᾳ το βραχυ βουκολιον.

"Seven kine, engraven on the jasper found,
Seem all to live within its tiny round.
But lest they tumble off the narrow plains,
A golden fold the little herd contains."

τας βους και τον ιασπιν ιδων περι
χειρι δοκησεις,
τας μεν αναπνειειν τον δε χλοηκομεειν.

"Seeing on the hand this jasper and its cows,
You'll deem it grass where breathing cattle
browse."

The point of the first, I fear, is a plagiarism from that of Plato the Younger's (B.C. 300). Anth. ix. 747.

you saw on the hand these cows and this Jasper, you would declare that the first were breathing creatures, the last a field of growing grass."

All these details show that the primary meaning of the name implied the stone now called the *Plasma*, a calcedony[2] coloured green by nickel, the better quality of which was distinguished as the Prasitis, "of the colour of verdigris," by Theophrastus (37), and as the Prasius by Pliny.

Thus it appears that the ancient idea of the *Jaspis* was exactly the opposite to the modern of the Jasper, the latter being our term for a class always opaque, and, in fact, corresponding better to the *Achates* of the Romans.

Subsequently other translucent colours were included under this denomination; Dioscorides, besides the Emerald-colour, admitting a second like crystal, a third of a sky-blue, and a fourth the Terebinthizon like the Callais. But Pliny, half a century later, greatly extends the list, seemingly including some shades of the modern Amethyst and Calcedony; one, the most valued, showing a tinge of purple (purpuræ), perhaps Rose-quartz, another of the Rose, the third of the Emerald. Again, another resembled the Sard, another the violet[3] (rather verdigris).

"Optima quæ purpuræ aliquid habet; secunda quæ rosæ; tertia quæ smaragdi"—"in Cappadocia ex purpura cærulea, tristis atque non refulgens—similis est et sardæ imitata et violas;" definitions applying exactly to the various shades of our purple quartz or false Amethyst. (See Amethystus).

The Persian and Caspian kinds were sky-blue, hence had the epithet of Aërizusa, explained by Pliny as resembling the colour of the sky on an autumn morning; these were also called Borea (Βορεῖα) by the Greeks. That this was our Sap-

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[2] Its translucency appears from the remark that the better sort were set *à jour* in rings—not backed, as was the usual plan for most gems: also by their being imitated by glass pastes, which threw their lustre out, instead of containing it within their substance. One of their defects was the *Sal*, or whitish flaws that often disfigure the Plasma.

[3] I fear Pliny has here mistaken the ἰός, verdigris, of the Prasitis in Theoph. (37), for ἴον, a violet.

phirine Calcedony appears from another circumstance: the finest and bluest specimens of that stone are to be found in the cylinders and the conical seals of the Persians. That from the Thermodon was azure, the Phrygian crimson, the Cappadocian azure mixed with crimson, and of a dull, lustreless tint. What stones are intended by these latter designations, unless, as above remarked, the modern Amethysts, it is impossible to discover.

There were many other sorts: the general defect of all was to be sky-blue, or like rock-crystal that is deficient in colour, or to resemble the myxa-plum (a dull yellow?), all defects belonging to our coloured quartz. To this species belonged the gems called *Sphragides*, par éminence, as making the best seals—"supremacy over all other signet-stones being awarded them on that account by public favour;" and Theophrastus says (23) the stones out of which signets are made for their beauty alone are the Sard, the Jasper, and the Lapis-lazuli.[4] Plato (Phædr. 210) has "the gems admired by the Greeks—Sards, Jaspers, Emeralds," arranging them apparently in the order of their value. But here another difficulty arises; intagli of the Greek period never occur upon the green translucent or pale blue calcedonies, properly the ancient Jaspis. The conclusion therefore cannot be resisted that this name was given to those bright yellow Sards the favourite material of the Greek gem-engraver, but which went entirely out of use under the Romans. Such a colour the Greeks termed χλωρὸς equally with the green, for their ξανθὸς was *orange*, being the term applied to hair which we call *red*. But in fact these yellow Sards (to keep to the modern incorrect terminology) often have a green shade, and sometimes darken into the

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[4] Fine specimens of the Jaspis continued to be prized under the Empire, in spite of the then comparative abundance of the true emerald. Thus Juvenal excuses the host's watchfulness over the "sharp nails" of his needy guest when he handles his jewelled cup, on this plea—

"Da veniam: præclara illic laudatur iaspis."

Similarly, Martial, after making his exquisite look over and bargain for all the most expensive articles in the Septa, or Grand Bazaar, slave boys, ivory carvings, *antique* bronzes, old plate, crystal and murrhine vases, ends with

"Sardonychas veros mensa quæsivit in omni,
Et pretium magnis fecit iaspidibus."

olive, an intermediate shade that links them with the Plasma. To this same class must similarly be referred those clear brown Sards called in French *Sardoine*, on which most of the finest antique work occurs. For this sort the Greeks had a most appropriate name, the *Capnias* or *Capnites*, the smoke-stone, for it has precisely the appearance of being thus artificially tinged. Pliny's "Onychi juncta quæ jasponyx vocatur" is that rare variety where an opaque red layer is superimposed on a translucent plasma. The title *Sphragides*, "seal-stones," could of necessity only have been given to a kind of stone used for that purpose, to the almost complete exclusion of every other. The Greeks did not reckon them *Sards*, because *Red* was the character necessary in that species, as is expressed by the name (from the Persian Sered). This will explain the epithet *Terebinthizon*, given to one sort by Dioscorides, it expresses the clear, liquid yellow colour, like *turpentine*, that distinguishes the favourite material of the Greek intagli. Pliny, having in his recollection the fraud, then so common, of making the false Sardonyx by cementing together its three different strata with Venice turpentine, says he fancies the Terebinthizusa was improperly so named, as being made up of many gems of the same family; but this notion, opposed as it is to the definition by Dioscorides, cannot apply to an unstratified stone.[5] It is also a strange coincidence that the accurate Virgil (iv. 261) should describe the sword of Æneas as "stellatus iaspide *fulva*."[6] Epiphanius also has "another sort found in the caves of Mount Ida in Phrygia resembling the dye from the purple murex-blood, but more transparent as approaching the colour of wine, and redder than the Amethyst.[7] For," adds he, "the Jasper is not invariably of one colour, nor of one quality, but some are softer and paler,

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[5] Pliny adds, however, that his explanation of the name is but conjectural: "Improprio ut arbitror cognomine."

[6] He doubtless had read χλωρᾳ in some original he was pilfering, and, not being versed in mineralogy, rendered it by *fulva* instead of *viridi*: which reminds us of Tennyson's use of the Sardonyx (evidently not having the least idea of the meaning of the name), when distressed for a rhyme:

"*And the Maid-Mother on a crucifix,—*
Beneath branch-work of costly Sardonyx."

[7] This establishes the opinion above advanced, that the Jaspis, besides the Plasma, included latterly all the varieties of the purple quartz; for the ancient Amethystus was the common Garnet.

and not very brilliant nor yet very deficient: others are like Rock-crystal; another somewhat dull, having lines in the middle; another, called 'the Ancient,' like snow, or froth of the sea, said by magicians to be feared by the beasts of the field and by spectres."

Another of Pliny's class Jaspis is "*starred* with red spots;" this is *not* the Heliotrope (which he describes accurately in 60), but a white Calcedony full of little red spots, called now St. Stephen's Stone, and formerly venerated as thus dyed by its employment in his martyrdom. Pliny reckons this at the end of his list of Jaspers amongst a number clearly of the common Calcedonies, one containing a cloud,[8] another tipped with snow, a third like salt, a fourth smoke-stained and hence called Capnias. And as a conclusive proof that he is here talking of the Calcedony, he mentions having seen one fifteen inches high, carved into a statuette of Nero in armour.

The conclusion to be derived from all the foregoing details is undoubtedly this: that the Jaspis of the ancients was our Calcedony (Silica and Alumina): in its primary sense the variety coloured green by nickel, now called Plasma, but in after times embracing the blue, the purple, the yellow, and whity-brown shades of the same substance.[9]

The *modern* Jasper, distinguished from the *modern* Agate as being quite opaque, and containing more iron, was certainly the stone known to the ancients as the Achates; the varieties of this chiefly employed by the ancient gem-engravers were:—

1. The Black: an extremely fine, close-grained substance, perfectly opaque, and taking a high polish, the good preservation of

[8] There is a specimen of such a "Jaspis nubem complexa" in the Marlborough Cabinet, a clear Calcedony, containing an opaque cloud. It is cut to a spheroidal form; and, from the place it holds, evidently once was deemed a wonderful rarity.

Pliny notices that the better kinds were set *à jour*: "Præstantiores funda cluduntur ut sint patentes ab utraque parte, nec præter margines quidquam auro amplectente." The oxtremely globose form given to the antique Plasma and Amethyst strikingly corroborates this observation.

[9] This is confirmed by M. Ben Mansur's division of the Jasper (Jasheb) into 5 kinds, viz., the White, clear; the White-Yellow; the Green-Black; the Black, transparent; the Dust-coloured: or, in modern phrase, calcedony, yellow sard, olive sard, brown sard or *sardoine*, and light-brown.

which shows the uncommon density of its particles. This has been used by the Greeks for some of their finest intagli, inferior or Lower Empire work never occurring in it. No description of such a stone is to be found in Pliny's list, unless it be briefly noticed as the *Antipathes.* The Greeks would probably have considered it a kind of *ἀνθράκιον.*

2. The Red: exactly the converse case of the preceding, no Greek intagli exist in this, whilst Roman, especially those of the Middle Empire and of the decline, abound, the best performances indeed of those times being executed in it. The most celebrated intaglio in Red Jasper is the head of Pallas, with the name of the artist, Aspasius, at Vienna. The earliest portrait in it that has been seen by me is one of Hadrian; the subjects for which it is usually employed are, moreover, in the taste of his age, chimeræ or symbolical combinations, astrological figures, and Bacchic masks and scenes. For the last, it was recommended by its colour, vermilion being the paint with which it was usual to stain the faces of the god of wine and his attendant satyrs. As this stone came into fashion so long after Pliny's times, he has left no particular description of it, though it seems to be intended by his Achates vermilion-coloured, "which was said, if boiled in a pot with oil and other drugs, to convert the whole mass within two hours to a vermilion dye."[1]

Similarly Orpheus (609) terms one sort of the Achates *μιλτοπάρηος* (vermilion-faced). It was not Pliny's Hæmachates, for *that* Solinus (xi.) describes as "blushing with spots of blood," and therefore our opaque Bloodstone, as distinguished from the translucent Heliotrope. Neither was it the *stone* Hæmatites (xxxvi. 25), for that was a loadstone, and therefore the magnetic iron-ore still so called. It was perhaps the Hæmatitis of Theophrastus (37), classed by him amongst the inferior gems, the Fossil Ivory, Prasitis, and Sapphirus, and which he describes as dry, and composed as it were out of clotted blood, having also a

[1] Apparently the same described (56) as the "Corallis, resembling vermilion, produced in India and Syene;" which would account for its so frequent use by the Egyptians, for amulets and symbolic figures, eyes, fingers, horses' heads, &c. This kind is pale, but uniform in tint, and at first sight would be mistaken for unpolished Coral.

variety of a paler tint. Pliny adds to this that it was found both in Numidia and in Arabia; and as he classes it amongst his *gems* (60), it may have been our Red Jasper. But his Hæmatites, the *mineral* (lapis), as distinguished from it (xxxvi. 37), was a red oxide of iron, very useful for all complaints of the eyes, and the cure of dysentery: which Orpheus (650) records was formed out of the blood of Uranus that fell to the earth when he was mutilated by Saturn. If steeped in water it readily dissolved and turned again into blood. It was sovereign for the eyes, because "the ancient god (Heaven) from whose veins it had flowed could not endure that mortals should, through blindness, lose the sight of his desirable countenance." Nevertheless, as Pliny's notice of the gem Hæmatites is entirely taken from Theophrastus and Orpheus, he evidently was not acquainted with the actual gem as being then used in jewelry.

There was very good reason why the Romans should have so greatly admired the Red Jasper when once introduced. The texture is extremely fine, and the colour a pure vermilion, both taking and retaining the highest polish, sometimes traversed by parallel straight black lines like fine hairs; another and a rarer variety deepens into a crimson. The source of these fine stones has been lost: it was probably Arabia. Red Jaspers are indeed found plentifully in Sicily, but of a coarser grain, and their red in varying shades, verging more into a chocolate; the true antique vermilion is only now to be discovered in specimens from Mexico. The Egyptians employed largely for amulets and symbolical figures a pale red sort, exactly resembling unpolished coral, which may be the second class of the Hæmatitis of Theophrastus.

3. A very dark-green, opaque, close-grained, much used by the Egyptians for all their intagli, from the times of the Pharaohs down to the Arabian conquest. The Basilidan Abraxas gems are for the most part cut in this material, which is evidently Pliny's Achates, found near Thebes, and destitute of either white or red veins. This stone seems to have been especially dedicated to the religious ideas (whether ancient or freshly developed upon an Indian stock) of the Egyptians, inasmuch as no fine works in the Greek or better Roman style ever occur in it. A most rare

variety is a beautiful dead apple-green, only found in India, such as the stone employed for the famous signet of Cleopatra in the Marlborough Gems. The material commonly used for the Phenician scarabs found in Sardinia, though greatly resembling this, is of a totally different nature, yielding to the knife-point and apparently a fine Serpentine. Either of these would be aptly described by a comparison of their colour to verdigris.

4. A light green, mottled with yellow, after the manner of the Moss-Agate, but quite opaque, also serves frequently for Mithraic and Basilidan talismans. This would seem to be the Tree-Agate of Orpheus (230) which insured fertile crops if tied round the ploughman's arm, or the horns of the oxen that ploughed the field.

5. A pale opaque yellow, exclusively used for talismans, astrological or gnostic, and certainly Pliny's Cerachates, of which Solinus observes "those that are of a waxy appearance being vulgarly plentiful are despised." He may, however, have had in view here that variety of the Calcedony now known as the Yellow Sard, a colour in the species that had quite gone out of fashion with the Romans of the Empire.

No stone held so high a rank in the alexipharmaca of both ancient and mediæval physicians as the Jasper. Pliny and Epiphanius have been quoted above as to the virtue of the Grammatias. Even the sober Galen records (Simp. Med. ix.): "The Green Jasper benefits the chest and mouth of the stomach if tied upon it. Some set it in a ring and engrave upon it a *serpent with radiated head*, just as King Nechepsos prescribes in his 13th book. Of this gem I have had ample experience, having made a necklace out of such stones, and hung it round the neck, descending so low that the stones might touch the mouth of the stomach, and they proved to be of no less service than if they had been engraved in the manner prescribed by King Nechepsos." What Galen understood by his "Green Jasper" is made apparent by the multitude of Plasmas belonging to his age, engraved with the serpent Chnuphis, surrounded by a long Coptic legend, and, in one instance, explained by an invocation in Greek "that he would keep in health the chest of Proclus." Such amulets are confined to the Plasma and the yellow Calcedony. Orpheus again (264)

affirms that, "if one offer sacrifice holding in his hand the polished Jasper, colour of the Spring, he rejoiceth the hearts of the gods, and they shall satiate his thirsty land with showers; for this stone brings down rain upon the parched-up fields." Pliny quotes as a sample of the impudence of the Magi, the assertion contained in the book dedicated to Mithridates by Zachalias the Babylonian, that the gem Hæmatites was not merely good for the eyes and the liver, but gave success to those having petitions to kings, and also the victory in lawsuits and trials. Here he seems to allude to Orpheus (670), who makes Helenus offer this auxiliary to Ajax when proceeding to the contest for the armour of Achilles, the acceptance of which would have ensured him complete success, and even the acquiescence of Pallas, patroness of his rival. Again the Achates from India was good against venomous spiders and scorpions, and "for many other great wonders." The vermilion-coloured made athletes invincible; perhaps the reason why the design of Hercules strangling the Nemean lion is so often found upon this kind.

Supported by the authority of Galen, its efficacy was undisputed even in 1609. De Boot testifies that in his own practice he has observed effects scarcely credible from the application of the Red Jasper in cases of hemorrhage, and mentions the prevailing belief that a Green Jasper engraved with the figure of a scorpion, when the sun was entering that sign, was a sure preservative against the formation of the stone in the bladder.

LAPIS LYDIUS: *Touchstone: Assaying.*

BACCHYLIDES, the lyric poet (B.C. 450), introduces in a simile, and Theophrastus (47) minutely describes this most ancient of the methods of assaying the precious metals: "Wonderful again is the property of that stone used for testing gold, for it appears in fact to possess the same power as fire, for that also acts as a test. For which reason some are puzzled about it in consequence of their not viewing the question in a proper light. For the stone does not really try the gold in the same manner as the fire; for the latter acts as a test by changing and altering the colour of the metal, whereas the former tests it by friction. For it has the power, as it appears, to distinguish the nature of each metal, the gold and the alloy; and it is said that lately a much better kind of Touchstone than the old one has been discovered, capable of testing not only fine gold, but also that alloyed with copper or silver, and of showing how much alloy has been mixed with the standard of the gold coin. The assays are taken from the smallest quantity, for the least weight is a grain of barley, the next the collybus (1¼ gr.), then the quarter, then the half-obol (5 gr.): from which they ascertain the amount of the alloy—all such Touchstones are found in the river Tmolus. Their form is smooth, and like that of a counter, flat, not spherical, but their size about twice that of the biggest counter used. For the purpose of assaying, there is a difference between the upper part of the stone which has been exposed to the sun, and the underside, the latter being the better test. This is a necessary consequence, inasmuch as the upper side is of a drier nature: for moisture is an impediment to its taking off the metal; hence in very hot weather the stone does not act so well, for it then emits a certain dew out of itself, by reason whereof it becomes slippery."

Pliny (xxxiii. 43) refers to this description by Theophrastus, adding that the Touchstone, besides its Latin name "coticula," was called the Lydian stone, and the Herculean. He further states, what seems incredible, that experienced assayers, by rubbing off a piece of any ore on this stone, "cum e vena ut lima rapuerunt experimentum," were enabled to declare without mistake how much gold, silver, or copper it contained within one scruple, "scriptulari differentia."

The present Touchstone is a black Jasper of a somewhat coarse grain, and the best pieces come from India. The Italian goldsmiths employ it in the following ingenious manner. They have a set, strung on a ring, of 24 "needles," little bars of gold, each of a known and marked standard from one carat up to twenty-four (or fine). Taking the gold to be assayed, they rub it on the stone; by the side of the streak it leaves, they rub the needle which seems to the eye the nearest in quality. Next they pour "aqua regia" on the two streaks, and if the solvent produces the same effect on each, it proves that the gold in the piece and in the needle is of the same standard. If there be a difference perceptible, they try another needle, until an exact coincidence is obtained. It is very singular that Tavernier should have known nothing of this method before he saw it generally employed by the *Banyan* goldsmiths: for as the Italian craftsmen are as immutable in their processes as the Hindoos themselves, they must have had this simple method of assaying in Tavernier's days. To exhibit the economy of the Banyans he adds that they carefully wipe the stone, after using it, with a lump of wax, which thus in course of time becomes charged with an appreciable quantity of fine gold.

The assay of gold by fire has been described under *Obryza* (Aurum). The Roman assay of silver was equally simple. Filings of the article to be tested were thrown upon an iron chafing-dish made white-hot: if the silver kept its colour it was proved *fine;* if it turned red (containing copper), of the second quality; but if black it was pronounced base. Pliny exposes an ingenious fraud of the silversmiths intended to baffle this test. They kept the chafing-dish beforehand steeped in urine, the salts of which, when the iron was heated, fixed upon

the filings assayed, and, whitening them for a time, so enabled them to pass for fine standard. Another and more ready test was to breathe upon the polished surface, the more quickly the breath dispersed, the better the quality of the plate. As the coin even in Pliny's age was falling so rapidly in its standard, we may suspect that the plate also was of a quality more or less debased, according to the honesty of the silversmith.

It is a curious fact that the Chinese *Tutenague* or "white copper" (of late years so largely manufactured here under the name of German silver) had already found its way to Europe as a substitute for the precious metal. Crinagoras sends to a friend for a birth-day present, "a *copper* flaggon (*olpe*) exactly resembling silver, an Indian work," together with a neat epigram (Anth. vi. 261).

The famed "Corinthian Brass" may be classed indifferently amongst the ancient alloys of either gold or of silver. Pliny describes three qualities of this composite metal, which was an alloy of gold, silver, and copper. In fact it was much the same as what our jewellers dignify with the name of gold, and employ for all articles not Hall-marked. The first quality was yellow-coloured, in which the gold preponderated; the second resembled silver, that metal constituting the greater portion of its mass; the third contained all three in equal proportions. Such alloys would all now pass for gold, and indeed the first is better than our 12-carat gold, and the third equal to our 8-carat, so much employed in neck and guard chains: but the Romans disdained to give the title of "aurum" to the noble metal unless totally separated from all baser admixture. This true "Corinthian Brass" was only used for making dishes and drinking-vessels. Pliny (xxxiv. 3) laughs at those dilettanti who gave that name to the material of the old Greek statues they so eagerly collected; adding, that "they pretended to a knowledge in this matter merely to distinguish themselves from other people, without in reality having any deeper understanding of it." This he proves by showing (in his catalogue of statuaries that follows) that the great artists whose statues these connoisseurs styled promiscuously "Corinthian," had flourished all of them some ages before the fall of Corinth. For he accepts as true the account given of the accidental dis-

covery of this alloy in consequence of a fire, in the sack of that city, having melted a number of works in the different metals that had been brought together (by the plunderers). Of the same tale Petronius makes his hero Trimalchio, the wealthy "snob," give an absurd version: "But that you may not take me for a know-nothing, I understand quite well how the Corinthian brass first came about. At the sack of Troy Hannibal, a cunning fellow and a big rogue, heaped up all the gold, silver, and bronze statues into one vast heap, and then set fire to it. The metals fused and ran all together. From this the workmen took and made pots, dishes, and statues. So arose the Corinthian metal; one thing out of several, but neither this nor that."

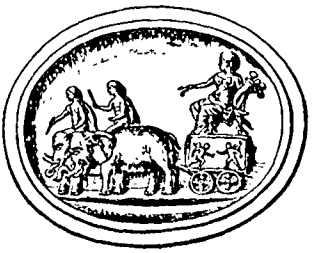
I have never been able to discover if any vessels in this composition yet exist: but their non-appearance would be no argument against the antique, and large, employment of the alloy. The article *Cœlatura* has shown how few of the innumerable pieces of gold and silver plate of those times have come down to us, and the precious alloy of the Corinthian would have consigned it to the same crucible as the works in the purer metals. Add to which, their surface *now* would (from the mixture of copper) be so coated with *patina* as to render their metal undistinguishable to the eye from ordinary bronze. The numismatists of the Revival were fond of espying the true Corinthian in the material of the large Roman coins, misled by its bright golden colour: they never reflected upon the trifling value of such pieces (four to the denarius) when actually in circulation.

That the alloy called *aurichalcum* was but another name for the *Pyropus* above described (AURUM) may be inferred from its name "gold-copper," and from the manner in which Pliny alludes to its appearance and use. He does not anywhere give its composition, which of itself is a reason for supposing he had already described it under another designation.[1] He quotes the best bronze, the *Livianum*, as "imitating the excellence of aurichalcum" (xxxiv. 2), in its colour evidently. The latter quality

[1] The *Pyropus*, copper with one-fourth of gold, only used for making foil "pretenui bractea ignescit" (xxxiv. 20). There was also a leaf-copper (our Dutch leaf) lacquered with ox-gall, called *Coronarium*, from its use in theatrical crowns.

is further indicated by the fact he mentions that it was used for foiling the paler sorts of the chrysolithus. That it was a costly metal is also clear from Horace's (A. P. 202) allusion to its use for binding the large and expensive flutes then in fashion at the theatre.

Its manufacture was preserved by the Italians down to the Revival, but only as the material of foils for precious stones; as will appear from a consideration of the recipes for making the different foils given by Cellini in his 'Oreficeria.' Pliny only mentions two kinds of them, the aurichalcum as just quoted, and a silver foil (argenteæ bracteæ) for the Sard. Now Cellini directs the jeweller how to make these sheets out of gold, silver, and pure copper, united in varying proportions according to the colour required. This last was produced by holding the polished sheet of metal (hence its name from *foglio*) over a charcoal fire until it acquired the proper tint: exactly as they now-a-days *blue* steel. It will be perceived that Cellini's alloys answer to the various kinds of Corinthian brass. Foils are now manufactured much more simply, by painting a sheet of silver-foil with the required colour mixed in a transparent varnish.



LYNCURIUM: Λυγκούριον: *Jacinth.*

The Lyncurium derives its name from the strange notion that it was the congealed urine of the Lynx, and it is thus described by Theophrastus (28): "Equally wonderful is the Lyncurium (for out of this also signets are engraved; since it is very hard, exactly like a real stone), for it attracts in the same manner as Amber; some say not only straws and bits of wood, but even copper and iron, if they be in thin pieces, as Diocles also hath observed. It is highly transparent and *cold* to the touch. That produced by the male lynx is better than that by the female, and that of the wild lynx better than that of the tame, in consequence both of the difference of their food, and of the former having plenty of exercise; the latter, none—hence the secretions of the wild are the more limpid. Those practised in the search find it by digging, for the animal endeavours to conceal the deposit by scraping up the earth after having voided it. There is a peculiar and tedious method of working up this substance also (as well as the Smaragdus)."

Pliny indeed (13) after apologising for mentioning the Lyncurium, to which he was forced by the pertinacity of writers on mineralogy, quotes the above passage from Theophrastus; and declares that unless the stone were Amber,[1] it nowhere existed at all in his time, and that the whole tale was a fiction. But Theophrastus knew Amber too well to make so ridiculous a mistake, in fact he proceeds to describe it accurately enough in the

[1] And to a certain extent he is right; the entire fable springing from the confusion between the *Ligurius*, *i. e.* Ligurian stone, and Lyncurius, which in the Greek pronunciation merely depends upon the duplication of the γ. Now we find that Amber was first obtained by the Greeks from these Cisalpine Gauls, and naturally would be called the Ligurian gem.

next chapter, stating its properties, and that the Greeks got it from Liguria, *i. e.* from the Celts, the nearest to them. Besides, the *coldness* of the substance, and its being used for intagli, prove that Theophrastus is describing an amber-coloured *stone:* for real Amber is remarkably *warm* to the touch, and much too soft and brittle to be used for engraving on. Pliny rejected the account without due examination, partly disgusted by the ridiculous story of its production; partly, because the stone known to Theophrastus, was then reckoned amongst the Chrysolithi by the Romans.

Epiphanius (De XII. Lapid. Ligurius) suspected that the Λιγούριον of the LXX., of which he could find no account in any Greek mineralogist, was the Hyacinthus of his own times, because so important a stone could not have been omitted by Moses; and here we find the first germ of the subsequent confusion of two very different things. Isidorus, however, correctly explains "Ligarius" as synonymous with Lyncurium, abbreviating the words of Theophrastus.

There can be no doubt that the *gem* described by the latter author is our Jacinth (Zircon), the yellow Jargoon, distinguished by having for its chemical base the earth Zirconia, peculiar to this family. This exactly resembles Amber in colour, refraction, electricity, and levity, and the sole distinction is its excessive hardness. We find in it also the two kinds mentioned by the Greeks: a dark orange, extremely agreeable in tint (the male); and a pale yellow of extraordinary lustre (the female).

Another argument for their identity is the frequency of its employment by the ancients, for intagli in the earliest times, and by the Romans for camei also. But for the latter purpose they preferred the darker kind, which, thus worked out, is extremely effective. The style of all engravings in this gem is altogether peculiar, so as to be easily recognised even in the impression from such an intaglio. It is characterised by a certain fluidity and roundness of all the lines, and a shallowness of engraving adopted apparently to avoid all risk of fracture in working so porous a stone. This porousness is manifest even to the naked eye, for a Jacinth held up against a strong light appears like a mass of petrified honey. This difficulty in the engraving is remarked

by Theophrastus in the passage above quoted, such at least appears to be the meaning of the obscure expression, "γίνεται δὲ καὶ κατεργασία τις αὐτοῦ πλείων." He alludes here to what he had just before said of the Smaragdus: "there is a particular mode of working this stone so as to give it lustre, for in its native state it is not brilliant." Probably he means by this that use of the Marcasite (instead of the usual Emery) which Ben Mansur describes as the only possible method of polishing the Laal (Spinel), one variety of which he gives as yellow, another as green. Now, as far as regards the peculiar lustre, texture, and electricity, as well as hardness, the antique Jacinth presents a wonderful analogy to the Spinel; only differing in this, that the former is a rich orange, the latter a crimson tinged with blue.

This explains the peculiar style of the Greek intagli, in Jacinth, worked out as they are in flowing and shallow hollows, evidently by a method dissimilar to that employed in the Sards and Agates of the same period. From its porous texture, in spite of its great hardness (7·5, that of the Spinel being 8), antique works in it have always a worn and scratched surface; so that a Jacinth exhibiting a perfectly polished exterior may justly be suspected of being a modern work, or at best retouched. Even the interior of the design, unless where protected by the unusual depth of the cutting, will be found to have suffered in a singular manner from the effects of friction and of time.

From its high electricity the soft wax (such as the Romans used in sealing) adheres to the intaglio, and will hardly afford a good impression: it is therefore singular that so many fine intagli should have been executed in it. But the Greeks, instead of wax, used pipeclay (the *creta* of the Romans) for their seals, to which the same objection does not apply. One of the finest intagli in Jacinth known is the head, formerly considered that of Pompey, but now with more justice attributed to Mæcenas (Rhodes Gems), which is rendered still more valuable by the supposed signature of the engraver Apollonius (see Mormorio).

The deep-coloured sort, of the richest orange-brown, usually found with antique Camei, for the most part heads of Fauns, Masks, and such like Bacchic ideas, carved out of it, has a better claim than the dark Carbuncle to be considered the

Morio[2] (so called from its mulberry colour), which Pliny notes was employed for engravings in relief, "ad cetypas scalpturas aptantur." As he makes such an observation concerning no other gem, it may be concluded that the Morio was then in great request for that purpose. This attribution is also supported by his definition of its three varieties; the Indian, entirely dark yet translucent, called also Pramnion (after a very strong red wine); the Alexandrian, with which a Carbuncle colour was mingled; and the Cyprian, verging upon the colour of the Sard. Köhler (Uber den Sard, &c.) maintains that by Morio the Romans understood the Black Sard (our Black Agate), only red and translucent by transmitted light; but though μορμὼ masks, in intaglio, are frequent enough in this variety, those in *relief* never occur in it.

The exact nature of the Mormorio is much elucidated by the discovery made (1838) in a tomb near Kertch, by A. Tscherkow, of a female skeleton, richly adorned with her choicest jewels—a laurel crown, in massy gold, on her head; earrings, with pendants, formed as Bacchic genii; and two necklaces, with hollow gold beads: crepundia. On her fingers were eight rings, of which three were votive, to judge from their extraordinary size. One was set with a bust of Pallas, three-quarter face, her helm crested by a bird with drooping wings, in high relief, of the finest Greek work: cut on "une pierre qui ressemble au grenat le plus foncé." The second bore the same relief, but the head in front face. Both these stones are nearly two inches long—their form, a wide oval. The third had a splendid Siriam Garnet nearly as large, with an intaglio: a god leaning on a sceptre, and placing his hand on the head of a smaller figure standing on a basis. (Bull. de l' Instituto, 1840.)

A perfect Jacinth is indeed a splendid ornament, and much superior to the best Brazilian Topaz, as having a peculiar golden lustre mixed with its rich orange; however, it is now completely out of fashion, and consequently of but little value, such are the unreasoning mutations of taste in these matters.

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[2] Or Mormorio (Jan's reading); a name the seeming connection of which with μορμὼ may account for its selection by the ancients for such like bugbear images as Satyric masks and Fauns' heads.

Our Jacinth was not the Lychnis, as some have taken it to be, the latter was indeed electric and hard to engrave; but the definition of its two distinctive colours, as crimson and purple (purpura and coccus), proves it indubitably the Spinel. The former was reckoned by the Romans (at least the yellow kind) amongst the Chrysolithi; a numerous genus, including every yellow stone, from the Oriental Topaz to the humble yellow Crystal, or Cairngorum. Some of the Indian kind probably were Jacinths, and the notice of the defect in the Arabian that they were cloudy and filled up as it were with their own filings or dust, aptly expresses the peculiar porousness of this stone.

Modern jewellers often term Jacinth, a stone belonging to a totally different species, the Cinnamon stone, a reddish-brown Garnet, greatly resembling it in outward appearance. But the Cinnamon stone may readily be detected by its total want of electricity, and also by the clearness or glassy nature of its substance when held against the sun, so different from the porous Jacinth. [CHRYSELECTRUM.] These may have been Pliny's (44) Chryselectri, dyed with saffron, and only to be distinguished from pastes by their coldness. The Cinnamon stone was engraved upon by the Romans and the later Persians, but not to nearly the same extent as the real Jacinth. The Renaissance artists employed the Jacinth very largely for works in relief, principally the yellow kind, which alone was then at their command. The ancients very rarely cut their camei in single-coloured stones, except in the dark-red or the purple materials so appropriate to the subjects.

The derivation of the name "Jacinth" is curious, and the following appear to have been the steps by which it came to be transferred to the modern gem from one of a very different family, which thereby has totally lost its original designation. "Jacinth," the French "Hyacinthe," comes to us from the Italian "Giacinto," formed according to the usual rule of that language from the Latin "Hyacinthus." Although it is plain that the Hyacinthus of the earlier writers, Pliny and Solinus, was our Sapphire, and its distinctive quality to them its azure colour, yet we find Epiphanius, at the close of the fourth century, describing under that name all the three varieties of the Precious

Corundum—the Blue, the Red, and the Yellow; following the Indians, who give the same generic title to all, but distinguish each sort by an epithet, denoting its colour; or, rather the Persians, who divide the "Jacut" (whence "Hyacinthus") into six classes. Now Sapphirinus, ultramarine, being employed to designate the Blue, or most esteemed sort, Rubinus, rosy, the next; these epithets, the noun being dropped, were used absolutely for designating these varieties, and thus became fixed in the jewellers' language as the Sapphire and the Ruby. But a third sort remained, the least valuable of all, the Citrinus or lemon-coloured, so known to mediæval writers. These last being the most common retained the generic name. As the importation of gems fell off and gradually became extinct, all yellow stones of superior hardness then circulating throughout Europe got confounded together, the more readily because nothing being now required in the way of engraving or even of polishing these relics of ancient prosperity, the eye was the sole means of estimating their quality and value. Now, the Zircon, a gem the most abundantly employed by the ancients both for intagli and for ornament, was therefore the most plentiful amongst the *yellow* gems treasured by the barbarian plunderers: it was hard and electric; it only came from India, the source of the Corundum species as well, and thus by degrees it usurped the name of Hyacinthus, previously borne by the rarer yellow gem, which now became the *Citrinus*. Besides this it would require an experienced mineralogist to distinguish by the eye alone a pale bright Zircon from the Oriental Topaz.

Pliny (xxxvii. 13) puts down as equally false with the story of its formation, the notion that the Lyncurium, if drunk in wine, or even worn, would expel the stone in the bladder and cure the *jaundice*; an early allusion this to the "Doctrine of Signatures," *i. e.* that each substance bore a natural mark (here, the colour), pointing out the malady for which it was a specific. Marbodus prescribes this stone for complaints of the chest, for the jaundice, and the diarrhœa. But his contemporary Psellus (De Lapid. Preface) puts down the Lyncurium amongst the stones about which nothing was then definitely known.

MAGNES: Μάγνης: *Loadstone.*

The Loadstone, or Magnetic Iron-ore, is a compound of Protoxide and Peroxide of Iron. It is black, heavy, and compact; sufficiently hard to take a good polish, which gives the surface a metallic lustre, like iron polished with black lead. Pliny (xxxvi. 25), on the authority of Nicander, states that the Magnet was so-called after the herdsman, who first discovered it in Mount Ida by its attracting the nails in his soles, and the ferule of his staff, as he walked over the bed. Pliny notices the great abundance of it in Spain; in fact, the richest iron-mines at present worked, those of Elba and Sweden, consist entirely of Magnetic ore. Sotacus divided it into five species: the Ethiopian, the best, and sold for its weight in silver; the second, found in Magnesia of Macedonia; the third, in Hyettus of Bœotia, redder in appearance than the second; the fourth, in Alexandria Troas; the fifth, in Magnesia of Asia; the worst of all being white and like a pumice-stone. That of Al. Troas was black and but feebly attractive, and was therefore considered the female of the species. It had been observed that the blacker they were (*i. e.* possessing more metallic, steely, lustre) the more powerful the Magnet.

It is a singular omission of Theophrastus that he should make no mention of this stone, though described by his master Aristotle accurately enough; his *Magnetis* would appear to be some kind of alabaster from his notice (41): "Some stones admit of being sawn, others of being carved, or turned in the lathe as the stone *Magnetis*, which holds a high rank for its beauty, and is by many much admired on account of its resemblance to silver, though it really has no affinity to that metal."

The singular nature of the Loadstone excited the wonder of the ancient naturalists. Pliny exclaims, "What is more inert than the rigidity of a stone? Yet lo! Nature hath given it

feeling and hands. What more contumacious than the hardness of Iron? She hath bestowed upon it both feet and complaisance: it is attracted by the Loadstone; and that metal, the subduer of all things, runs to meet something or other that is bodiless (inane), and when it comes near leaps towards it, is held by it, and clasps it in its embraces. Hence is it termed Sideritis; and by others, for the same reason, *Heraclios*, or the stone of Hercules." Claudian has an elegant pœm (Id. V.) upon a shrine, containing a statue of Venus made of Loadstone, and another of Mars in iron. When the festival of their marriage was celebrated these statues were brought near, and by mutual attraction appeared to fly into each other's arms. There can be no doubt the poet is describing what he had himself witnessed.

Dinochares (or Timochares) the architect had, according to Pliny (xxxiv. 42), commenced vaulting over the temple of Arsinoe, at Alexandria, with blocks of Loadstone, with the idea that her statue, to be made of iron, would thus remain suspended in mid-air. Hence the source of the mediæval fable concerning Mahomet's coffin thus balanced in his monument at Mecca. The Romans were acquainted with the fact that the Loadstone communicates its virtue to iron; they amused themselves by putting together a series of magnetized iron rings, so as to form a long chain by their cohesion. Iron thus magnetized was called by the ignorant vulgar "Quick Iron," and supposed to inflict more dangerous wounds.

The *Gold Magnet* of Ben Mansur is evidently nothing more than the Magnetic-Iron Pyrites: its property of attracting gold being a mere inference based upon its colour. The same holds for his Silver Magnet. His *Camahen* or *Ass-stone*, very hard, but which breaks up into splinters, is clearly this Magnetic-Iron Ore, called improperly Black Hematite. His epithet exactly applies to its grey colour. Now taking into account the general use of this substance in ancient *Persia* for intagli, in his age regarded as talismans, the use of *Camahen* as denoting an engraved stone, *par excellence*, and its introduction in that sense into Europe by the Crusaders, furnish a plausible explanation of the origin of the much disputed term Cameo, originally written Camaut. (See CAMEO.)

The earliest and the latest essays of the Glyptic art amongst the ancients were made upon the Loadstone. It is the favourite material for the Assyrian cylinders, as well as for the Cuphic signets, which close the history of Oriental intagli. So common a material was disdained by the Greek engravers, and after their example by the Romans, until the diffusion of Eastern doctrines in the third century brought the material again into favour as an amulet, and the Gnostics (at least those sects whose tenets had rather a Persian than an Alexandrian root) used it very largely in the manufacture of their talismans. As may be well supposed, nothing valuable in the artistic point of view is ever to be found in this stone: the only tolerable intaglio that has come under my notice being a bust of Abundantia, in the Marlborough Cabinet. Yet the material is compact, takes a high polish of a steely lustre agreeable to the eye, which in spite of its comparative softness it retains unimpaired by time.

The name *Sideritis* was also employed to distinguish one species of the Adamas: the electric property of the one being confounded with the attractive of the other. Similarly we find the name *Androdamas* equally applied to both species. The Adamas, in virtue of its superior value, was believed not merely to greatly surpass the Loadstone in attractive force, but even by its presence entirely to deprive the other of its natural powers. A vestige of this confusion still is preserved in the French name for the Loadstone, "Pierre d'Aimant," formed like their "Diamant," ab Adamante. The Hæmatites, included by Pliny under the head of "Magnes," was the reddish-brown compact iron-ore still so-called, and used in the burnishing of metals, especially for smoothing down the surface of the gold-leaf, in gilding, and damascening. The best kind was procured by the ancients from Zmiri in Ethiopia; at present Compostella supplies all the jewellers of Europe. The only use the ancients made of this mineral was burnt and powdered in eye-salves: its astringent quality being doubtless of some efficacy in relieving inflammation of that organ. A curious but fanciful test of the true Hæmatites was its attractive powers being restricted to the common Magnet, not acting upon any other metal.

Orpheus extols (302) the virtue of the Loadstone as conciliating

to the wearer the love both of gods and men; and prescribes it as a sure test for ascertaining if a wife has been faithful to her lord during his absence, for if put under her pillow as she sleeps, she will, if an adulteress, be dashed out of bed by its influence.

> "If e'er thou wish thy spouse's truth to prove,
> If pure she's kept her from adulterous love,
> Within thy bed unseen this stone bestow,
> Muttering a soothing spell in whispers low;
> Though wrapp'd in slumber sound, if pure and chaste,
> She'll seek to strain thee to her loving breast:
> But if polluted by adultery found,
> Hurl'd from the couch she tumbles on the ground."—Ver. 312.

Marbodus adds another more mischievous (if possible) quality: that its powder strewn secretly upon the embers will drive all the inmates out of a house panic-struck, and give the operator an opportunity to rob it unmolested.

> "If a sly thief slip through the palace door,
> And strew unseen hot embers on the floor,
> Then powder'd loadstone on these embers spread,
> The inmates flee, possess'd with sudden dread.
> Distraught with horrid fear of death they fly,
> Whilst from the square the vapour mounts on high.
> They fly: within the house no soul remains,
> And copious spoils repay the robber's pains."—Ver. 305.

Orpheus (636) sings, moreover, at great length the mystic virtues of the Hæmatites; not, however, the magnetic ore just noticed, but a soluble oxide of iron, of a styptic quality, and an excellent medicine for the eyes (see p. 208).

The Loadstone was used in glass-making, being supposed "to attract to itself the liquid of the glass in the same way as it does iron" (xxxvi. 66). Probably it acted as a flux in promoting the union of the silica with the soda. Oxide of iron is now used in enamels to produce a red; perhaps therefore the Loadstone was the basis of the opaque red glass, Pliny's Hæmatinon, so much introduced into the later Roman mosaics. As the green and blue tinge of common glass is due to the small proportion of iron found in the unpurified ingredients used in the manufacture, the remarkably deep blue and green characterising Roman glass, as seen in the more frequent specimens, may

be due to the proportion of Loadstone thus purposely introduced.[1]

CLAUDIAN. ID. V.

"A stone there is which people Magnet style,
Dull, dark in colour, of appearance vile:
Unlike to such as deck the comb'd-back hair
Of princes, or the neck of maiden fair;
Or such as on the golden buckles shine,
Which by their clasp the imperial belt confine.
Yet such its wondrous force, it far outweighs
All beauteous ornaments, all jewels' blaze,
Or all those treasures which on Eastern shores
The Indian 'midst groves of coral red explores.
From steel it draws its force—from steel it lives;
'Tis this its food, 'tis this its banquet gives,
And hence renews its strength; pour'd through its veins,
The rugged aliment its life maintains.
Of this deprived, its frame exhausted lies,
Fierce hunger gnaws, and thirst consuming dries.
With gilded ceilings deck'd a temple shines,
And two Immortals grace two common shrines:
Mars, scourging nations with his bloodstain'd spear;
And Venus, solace sweet of human care.
Different their mould—in iron Mars commands;
Sculptured in Magnet lovely Venus stands.
Their nuptials high with solemn rites to grace
Prepares the priest, the guardian of the place.
The blazing flambeaux lead the dancing quire;
High o'er the gates the myrtle boughs aspire;
With heap'd-up roses swells the marriage-bed;
The nuptial chamber is with purple spread.
Behold a marvel! Instant to her arms
Her eager husband Cythereia charms;
And ever mindful of her ancient fires,
With amorous breath his martial breast inspires;
Lifts the loved weight, close round his helmet twines
Her loving arms, and close embraces joins.
Drawn by the mystic influence from afar,
Flies to the wedded gem the God of War.
The Magnet weds the Steel: the sacred rites
Nature attends, and th' heavenly pair unites.
Say from what source to differing metals came
This hid affinity, this wondrous flame?
What mystic concord bends their stubborn minds?
The panting stone love's melting influence finds,
Seeks the loved metal her deep wound to heal;
Whilst love's mild pleasures tame the cruel steel."

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[1] It is likely enough that Pliny here means the oxide of Manganese, which from its property of purifying the *pot-metal* bears the popular name of *glass-soap*. The word Manganese comes from the old chemical appellation given to this mineral from such a use *Maganesia Vitrariorum*, itself evidently a form of *Magnes*. This mineral was used by the Etruscan for making the black varnish covering their vases.

MARGARITA: Μαργαρίτης: *Pearl.*

This word is merely the Greek form of the Sanscrit *Maracata*, or the Persian *Merwerid*, and approaches yet more nearly to the original in Μάραγδος, used by Menander (Ath. iii. 94). Theophrastus, however, writes Μαργαρίτης (36) in his brief notice: "To the number of gems admired belongs that called the Margarites: transparent by its nature: and they make out of it the necklaces of great price. It is found within a shell-fish resembling the *pinna*, only smaller. In size it is as large as the eye of a tolerably big fish." It seems to have been known from the earliest times to the Asiatic Greeks from their intercourse with the Persians, ever the greatest admirers of the Pearl. Homer (Il. xiv. 183) describes Juno's ear-rings as τρίγληνα (*glain*, bead, Welsh): this epithet "triple-eyed" can hardly apply to anything but the Pearl, especially as no precious stones are ever alluded to by this poet. Three pearls increasing downwards in size composed the ear-pendant most admired by the Persian queens, as their portraits on the gems manifest.

Athenæus (iii. 93) gives an admirable account of the natural history of the Pearl-oyster, extracted from the Periplus of India by Androsthenes: "Of the Strombi, and the Porcellanæ, and the other shell-fish there are numerous varieties, and very different from those with us. There is also a great abundance of the Murex and other oysters: but there is one peculiar kind which the natives call *Berberi*, from out of which comes the gem Margarites. This latter is highly valued throughout Asia, and is sold amongst the Persians and the regions inland for its weight in gold coin (πρὸς χρυσίον). The appearance of the shell is similar to the Pecten, it is not however striated, but has the outside smooth and furry. Neither has it two ears like the

Pecten, but only one. The gem grows within the flesh of the oyster, just as the measles in pork. One kind is extremely yellow, so as not readily to be distinguished when placed by the side of gold; another is like silver; a third perfectly white resembling a fish's eye."

Chares of Mytilene, in the 8th Book of his History of Alexander, says: "It is caught in the Indian Sea, and also off Armenia, Persia, Susiana, and Babylonia, and resembles the Oyster; but is both bulky and long, containing meat both large and white, and of very agreeable odour. From which they extract the white bones and call them Margaritæ, and make out of them necklaces, and bands for the arms and ankles; on which both Persians and Medes and all the Asiatics set a much higher value than upon those made of gold."

But the fullest details are to be found in the Description of Parthia by Isidorus of Charace: "In the Persian Sea is a certain island where abundance of the Pearl-oyster is to be found. Wherefore rafts of reeds (bamboos) are stationed all around the island, from off which the divers, jumping into the sea to the depth of 20 fathoms, bring up two shells at a time. They assert that when there are continuous thunderstorms and falls of rain (the Monsoon), the Pinna then breeds more, and the pearl becomes most plentiful and of good size. In winter the shell-fish is wont to retire into its holes in the deep: but in summer they swim about with their valves gaping wide open by night, but keep them closed by day. All that grow close to rocks or stones put forth roots, and abiding there fixedly breed the pearl. They are born alive, and are nourished through the part attached to the flesh. The latter is firmly fixed to the mouth of the shell, and has claws and catches food. This part is exactly like the little crab called the Pinnophylax. From this the fleshy part extends as far as the middle of the shell like a root, along which the pearls are bred, and grow through the solid part of the shell, and increase in size as long as they remain attached. But when the fish recedes along the length of its projection, and gently cuts off and severs the pearl from the shell, though it envelopes the pearl it no longer nourishes it, only renders it more polished, more transparent, and purer. The

pinnæ of the deep water produces the most lustrous and clear, and largest pearl; that which swims near the surface is spoilt by the rays of the sun, and gives those of bad colour and smaller size. Those that fish for pearls run a danger when they thrust their hands straight into the gaping shell, for then it shuts to, and often snaps off their fingers: and some are killed immediately. But all who put in the hand transversely, easily pull away the shells from the rocks."

These same authorities Pliny seems to have followed in his account of the formation of the pearl: merely adding that the impregnation was produced by the dews of heaven falling into the open shells at the breeding time; an essential point evidently omitted by Athenæus from his abstract of the passage in Isidorus. The quality of the pearl varied according to that of the dew imbibed, being lustrous if that was pure; dull, if it were foul. Cloudy weather spoilt the colour, lightning stopped the growth, but thunder made the shell-fish miscarry, and eject hollow husks called *physemata* (bubbles). He adds that Taprobane (Ceylon) was then, as until lately, the seat of the most productive fishery. Pliny remarks their formation by numerous concentric layers (multiplice constant ente), and hence properly concludes them to be mere callosities formed in the body of the fish. In fact the pearl is a mere concretion of the matter forming the shell that accumulates upon some foreign body accidentally introduced into the shell (usually a grain of sand), for the purpose of preventing the irritation its roughness would otherwise occasion to the tender inmate.

Those of hemispherical form were called Tympania (tambourines): the shells to which some were firmly attached were preserved in this condition to serve for perfume-holders. There was a story that the shoals of pearl-oysters had a king distinguished by his age and size, exactly as bees have a queen, wonderfully expert in keeping his subjects out of harm's way; but if the divers once succeeded in capturing him, the rest straying about blindly fell an easy prey. Though defended by a body-guard of sharks, and dwelling amongst the rocks of the abyss, they cannot, says Pliny, be preserved from ladies' ears.

The shells when caught were thrown into vessels filled with

salt, and left there until all the fish was consumed, leaving the pearls, "its kernels," at the bottom.

Those of the Red Sea were the most transparent; the Indian though of superior magnitude to all others, had somewhat of the lustre of Talc: the best quality were distinguished by the name of *Exaluminati*, i. e. transparent as a globule of alum. Some, but of bad quality, were found in the Mediterranean, in the Bosporus, in the Mya shell (muscles), off the coast of Acarnania in the Pinna-shell (scallop): these last were ill-shaped, and opaque like marble. Those found about Cape Actium were better, though of small size, as were those of the Mauritanian coast. It had been ascertained that they were produced in Britain, though of small size and bad colour, for Julius Cæsar "wished it to be understood that the breastplate dedicated by him to Venus Genetrix was made out of British pearls." Pearls are now procured in great abundance from the Tay (out of mussels), and are much used in English-made jewelry: being when recent hardly distinguishable from the Oriental, but subject to the great defect of turning black by wear, and therefore of incomparably less value than the latter.[1]

Pearls in the ancient world held the highest rank amongst Precious Stones, and for an obvious reason: their beauty is entirely due to Nature, and is susceptible of no improvement from Art. But in the more valuable, and which are also the hardest kind of gems, the exact converse holds good; their hidden beauties were but poorly elicited by the small degree of polish the Indian or Roman lapidary was able to give them. Hence the Persians, even to the times of M. Ben Mansur, assigned to Pearls the first rank amongst precious stones: the Romans indeed followed the Indian valuation, and placed them after the Diamond, but that merely on account of the virtues of the latter as an amulet, not for its beauty. It is on record also that the prices paid by the Romans for pearls of extraordinary size far exceeded those given for any other kind of gem.

[1] An enormous development has taken place in the Scottish pearl-fishery in consequence of its so largely producing the rose-tinted kind, now infinitely the most esteemed in Parisian high-life: a change of taste effected recently, "mulierum sane Senatus-consulto."

In all the portraits of the Sassanian kings the eye is immediately struck by the huge pearl hanging from the right ear, and which the artist, to judge from the care bestowed upon its representation, has evidently considered one of the most essential points in his image of the sovereign. His solicitude brings to our recollection the romantic tale so well related by that most amusing of chroniclers, Procopius (Bell. Pers. i. 4), concerning that pearl of unrivalled magnitude obtained at the urgent entreaty of king Perozes by the daring diver from the guardianship of the enamoured shark, but with the sacrifice of his own life. And how vividly does he bring before us the final catastrophe, when disappeared for ever from the world this inestimable miracle of nature: when the Great King, resplendent in all his jewels, at the head of his mail-clad chivalry, charged the flying hordes of the Ephthalite Huns, and, in the very moment of falling into the vast pitfall into which he had been entrapped by their feigned retreat (which engulfed him, his sons, and his bravest nobles), tore from his right ear this glory of his reign and cast it, before himself, into the abyss, there to be eternally lost amidst the hideous chaos of crushed man and horse—comforted in death with the assurance of thus cheating the foe of the most glorious trophy of their victory. Nor could the Huns, although stimulated to the search by the enormous offers of his Byzantine rival in similar ostentation, the Emperor Anastasius (who promised five hundredweight of gold pieces to the finder), ever succeed in recovering from the pit of death the so highly-coveted jewel.

As no two Pearls were ever found exactly alike, this circumstance gave them their name of *Unio* (unique). Although the truly spherical were, as ever, the most prized, yet the pear-shaped were also admired. These were termed *Elenchi.* Ladies wore these suspended to their finger-rings, and two or three together as ear-drops, in which they were entitled *Crotalia* (rattles), from the musical sound they gave out as they clashed together. Even the poorer classes strove for such a distinction, holding that the Pearl served for a gentleman-usher to a woman in public (lictorem fœminæ). Similarly, in our day, the grand ambition of every Tuscan girl, however poor, is to get a necklace of many rows of pearls, no matter though ill-shaped or

discoloured: such an ornament in most cases sufficing for her dowry.

The greatest magnitude is attained by pearls of a very irregular shape, aptly termed by the French "Perles baroques." These malformations were ingeniously utilised by the fanciful taste of the Cinque-cento, and, by the addition of the required members in gold enamelled, converted into sea-monsters for pendant ornaments. In the Devonshire Cabinet there is a superb example, a monster-pearl of the finest water, but singularly distorted, and now serving for the body of a very graceful mermaid; valued at 2000*l.* Yet more curious is the Londesborough unicorn, composed of two *baroques*, and mounted by France and Victory embraced. The Romans of the Decline distinguished the perfect, spherical, *unio* from the *perle baroque*, always terming the latter *margaritum*. The Persians make twelve classes of the pearl (Lulu) according to its shape; and as many according to its colour.

The Asiatic conquests of Pompey first turned the taste of the Romans after pearls and precious stones (xxxvii. 6). In his triumphal procession were borne 33 crowns made out of pearls, a temple of the Muses with a dial on the top, and a figure of the victor himself, formed out of the same precious materials. This last piece of extravagance excites beyond all reasonable bounds the wrath of the Stoic Pliny, who devotes several lines, chary as he is of space, to the objurgation of such luxury; and interprets the ostentatious exhibition of Pompey's head in this manner as a presage of Divine anger, foreshowing that hereafter the same head severed from the body was to be held up as a public spectacle. In this example, adds he, Caligula might find an excuse for wearing slippers made of pearls, or Nero, who formed out of them sceptres for the characters on the stage, and couches for his amours.

Thus it appears that on their first introduction at Rome, Pearls had been employed as materials for art. Not that they engraved in relief or intaglio upon so small and precious a body: the figures above described must have been formed of small pearls strung on wire, or white horsehair, and thus fastened upon a model in a kind of mosaic, just as the *Lamb* of the Golden Fleece, or the brooches of seed-pearl, are now constructed.

Pliny mentions (58) that he had seen Lollia Paulina, the widow of Caligula, covered head, neck, ears, and fingers with strings of pearls and emeralds placed alternately to the value of 400,000*l.* of our money (quadringenties HS.): plunder collected by her grandfather Lollius from all the princes of the East. As, he remarks, she thus appeared upon no very grand occasion, but merely at a private dinner-party, we are to conclude that this display exhibited but a small portion of her jewelry.

The largest pearl known to the Romans weighed half an ounce and one scruple over (260 grs. troy). This magnitude has seldom been equalled in modern times. Barbot ('Pierres Précieuses,' 470) quotes one belonging to the treasury of the Crown of France in 1791, weighing 108 grs., valued at 8000*l.* De Boot speaks of one belonging to Rudolf II. weighing 180 grs. Philip II. possessed one as large as a pigeon's egg, of 134 grs., and worth 50,000 ducats. This came from the Panama[2] fishery, and was entitled La Peregrina; it was pear-shaped, the form in which the greatest bulk seems to be attained by this species. But the largest on record is that, also pear-shaped, brought from India in 1620 by Gougibus de Calais, and sold to Philip IV., of the weight of 480 grs. The merchant, when asked by the king how he could venture to risk all his fortune in one little article, replied, because he knew there was a king of Spain to buy it of him. This, says Barbot, now belongs to the Russian Princess Yousoppoff.

Everybody knows the story told by Pliny of Cleopatra, who, to outdo Antony's extravagance, wagered with him that she would spend a sum equivalent to 1,000,000*l.* (millies HS.) upon one dinner. When her lover ridiculed the banquet as in nothing coming up to her promise, she replied that it was merely an adjunct to the grand dish; and wearing in her ears the two finest pearls then known of the value above mentioned, she threw one of them into a vessel of the strongest vinegar set before her, and as it dissolved immediately she drank it up.

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[2] Which now, with Bahrein, chiefly supplies the market: the great oyster-bank off Colombo being of late years unproductive. Ben Mansur reverses Pliny's estimation, and puts the pearls of Serendib (Ceylon) before the Arabian—these being the only two species known to him.

The fellow to it was about to share its fate, when L. Plancus, who had been appointed umpire in the matter, seized it, declaring that Antony had lost. This pearl, on the conquest of Egypt, was sawn in two to make pendants for the ears of the Venus in the Pantheon: the goddess, remarks Pliny, being well satisfied with half of their dinner.

As regards this story, no acid that the human stomach could endure is capable of entirely dissolving a pearl even after long maceration in it. Barbot on trying the experiment found the outer layer was reduced to a jelly, whilst that beneath was not at all affected. No doubt the wily queen swallowed the pearl whole in some more agreeable potation than vinegar, secure of its ultimate recovery undamaged, and invented the fiction of its complete and instantaneous dissolution, which, be it observed, rested entirely on her own testimony, in order to gain her wager.

The same experiment is recorded to have been tried somewhat before by Clodius, son of Æsopus the player, who, having discovered that dissolved pearls possessed the most exquisite flavour, did not selfishly confine his knowledge to himself, but gave one a-piece to each of his guests to swallow. Powdered Pearls were formerly considered as an invaluable medicine in stomach complaints: the benefit they produced must have depended entirely on the imagination of the patient, the substance being a mere antacid, no more efficacious than the powder of the shell.

MOLOCHITES: Μολοχάς.

It is difficult to discover what stone Pliny designates by this name; but that it was *not* our Malachite (Green Carbonate of Copper) is sufficiently evident from his words (xxxvii. 36): "the Molochites is not transparent, being of a closer and coarser green than the Smaragdus (spissius virens et crassius), obtaining its name from its mallow-leaf colour; praised for making good impressions of the seal, and used as an amulet for children, from the virtue innate therein against all the dangers to which they are liable. It is produced in Arabia." Our Malachite was his Smaragdus Medicus, "found of greater dimensions than any other of the sort, of a wavy pattern, representing poppies or birds' feathers, &c., and sometimes *resembling the Lapis-lazuli.*" Now the description of the Molochites as of a close deep-green colour, is entirely opposed to the notion of a stone where the surface is so curiously variegated as in the Malachite. Besides, the latter is much too friable a substance to serve for intagli,—nay, more, to be in request for that purpose, an inference to be drawn from the expression "laudata." But these characters apply admirably to a certain pale-green Jasper, perfectly opaque, and of a dead surface, in which admirable intagli sometimes occur, notably the famous Cleopatra (Marlborough). The reason why this species of the "Jaspis" is not classed under that head, but described by Pliny as a distinct mineral, is because a certain degree of translucency was essential to the ancient idea of that stone. Its Arabian origin also favours this attribution; at present that peculiar variety is found in India alone.

The same inference may be drawn from the obscure notice in Epiphanius (under "Sard"): "There is also another sort, the Sardonyx, which is called Molochas, and has the property of

dispersing steatotomous tumours. It has the same appearance as the first (the Sard), but is somewhat greenish. (*ὑποχλωρίζων*)."

The cause of the ancient name for this very dissimilar stone being applied to our Malachite, lies apparently in Pliny's allusion to the general use of the former as an amulet. Now the Malachite in the Middle Ages enjoyed a mighty reputation for its virtues in this respect, probably suggested by the mysterious figures and natural hieroglyphics to be traced by a fanciful eye upon its variegated surface. De Boot says that it was even then worn in bracelets as a preservator of the health, "being believed to possess the greatest virtues; preserving the wearer from lightning, perturbation of spirits, contagion, and witchcraft; for which latter reason it is hung round children's necks. The superstitious, and magicians who think themselves the only wise people, engrave upon it the figure of the sun, and thus believe themselves secure against demons and poisonous reptiles." Such a coincidence of supposed virtues, when the ancient material was no longer forthcoming, naturally led to the transfer of the name to the other equally virtuous substitute.

Mohammed Ben Mansur, after describing his five species of the *Dehne* or Malachite, observes, "This stone is only valued in Syria and the land of the Franks." He confirms my explanation of this being Pliny's Smaragdus Medicus by the statement that if rubbed with oil it gains a greater lustre: the very thing remarked by Pliny touching the former, "those not perfectly green" are improved by the application of wine and oil." To remove all doubt as to the mineral called Dehne, Ben Mansur concludes with, "If ground down with oil and natron (soda), the purest copper is obtained therefrom."

Antique camei in Malachite, though extremely uncommon compared with the frequency of modern works in this soft material, nevertheless do exist. In the Pulsky Gems is the most lovely bust of a Bacchante, belonging to the best period of Roman art, still retaining on portions the thin, hard patina of brown oxide with which its surface was entirely incrusted when it came into the hands of the present owner—a convincing proof of the ages that must have elapsed since its first concealment in the earth.

MURRHINA: Μορρία: *the China Agate.*

Although this substance is continually alluded to by the writers of the Roman imperial times as the material of the most costly vases, yet the only description of its appearance and nature is that to be found in Pliny (xxxvii. 8). "The East sends us the Murrhina. They are found in several places, all little known, and within the Parthian dominions, but principally in Carmania. They are supposed to be formed from a liquid hardened by subterraneous heat. In superficial extent, they never exceed that required for a small dish (abacos), and in thickness seldom suffice for a drinking-cup, like that just mentioned. They have a lustre without any strength, or rather a polish (nitor) than a lustre. But their value lies in the variety of their colours, the spots suddenly turning themselves around into purple and opaque-white, and a third made up of both; the purple as if by a transition of colour becoming fiery, or the milk-white part turning red. Some principally admire the extreme parts in them (*i. e.* the edges of the vases), and a certain play of colours like that seen in the rainbow." Hence Martial makes his amateur cry for "*maculosæ* pocula murrhæ" (x. 80). Others like the spots to be opaque and fatty (pingues): any transparency or paleness is considered a defect. So are marks like salt, and warts, which do not indeed project, but are embedded in the substance, and that very often. The substance is somewhat recommended also by its agreeable smell."

Such a description would appear definite enough to enable a mineralogist to identify with ease the exact material intended, nevertheless upon no one point in the science have so many diverse theories been propounded. De Boot, alluding to the then prevailing notion that they were Chinese porcelain (recently

made known by the Portuguese in his own days), treats it as absurd, and explains the term as designating the vases of Sardonyx, of which he had seen antique fragments. In the last century the French archæologists, headed by Mariette, adopted the porcelain explanation, and discovered in Pliny's "purple and white spots" an exact description of the paintings ornamenting China-ware. It is impossible however to conceive anything more absurd than the supposition that an acute observer of nature, like Pliny, and with his knowledge of art, could have mistaken the Chinese drawing, however grotesque, and evidently *laid* upon the surface by art, for the natural spots and veins *in* a parti-coloured stone. But these antiquaries disregarded common sense, being so completely led astray by Martial's "murrhina picta" (a mere poetical allusion to its varied colours), and above all by Propertius with his

"Murrhea que in Parthis pocula *cocta* focis" (iii. 5).

This last description is merely the same thing, expressed in his usual farfetched way, as Pliny's: "a liquid substance solidified by subterranean heat." And in this he was wonderfully correct, for the Porcelain Jasper, a cognate material, is now pronounced to be clay metamorphosed by volcanic action. Or if we choose to take the "Parthis focis" literally, the poet may possibly allude to some method of improving the colour of the stone by heat, as still practised by the Indians with the Carnelian. These antiquaries must have wilfully shut their eyes to another line of Propertius (iii. 10), where he makes it synonymous with the Onyx—

"Et croceus nares Murrheus ungat onyx."

Dr. Hager considered it to be the Yu-stone or Jade vases, so much valued by the Chinese, which *might* have been brought by caravans into Carmania. Veltheim, seriously taking up a jocular remark of Lessing's, maintained that the Murrhine vases were nothing else than those so commonly seen now, made out of that dull-brown mineral streaked with white, the Chinese Steatite (or Speckstein). Böttiger does not attempt to decide the question, but rather inclines to the notion that they were of coloured glass. Corsi thought he had discovered all the required peculiarities

in the Fluor Spar or Blue John of Derbyshire, but it is very doubtful if that substance was known to the Romans at all, the only mines of the beautiful quality fit for ornamental purposes being in Cornwall and Derbyshire. Mongez, basing his decision upon the iridescence above noticed, proves it must have been Cæholong, or Semi-Opal, but the large dimensions specified of the antique pieces entirely controvert such an explanation.

Strange to say, the first English translator of Pliny, old Philemon Holland, has come nearer the mark than any, by rendering the word as *Cassidoine*, or Calcedony; in fact he is perfectly correct, if we take that term in its fullest sense. For the only mode of arriving at the true solution of the question is by the careful examination of ancient remains, more particularly those exhumed in Rome itself. For if the whole vessels of an imperishable material were so abundant there during the four centuries of the Empire, as contemporary allusions lead us to believe, it is a logical consequence that their fragments at least must be as plentiful in the same place at the present day, since no possible circumstance could have swept them entirely out of existence. Now what is actually the case? Fragments of bowls made of Agate (but of no other stone) are turned up in abundance in the soil of the ancient capital, and often of a radius that bespeaks the extraordinary circumference of the perfect vessel. Such pieces, if not large enough to be preserved as antiques, are cut up into brooch-stones; and every year furnishes the Roman lapidaries with an inexhaustible supply. Perfect vessels, from the fragility of the substance, are rare, yet a comparatively large number are yet in existence. Of these by far the most magnificent example is to be seen amongst the Townley Pastes (Brit. Mus.), a flat shallow dish with two slightly projecting ears angularly cut: fully a foot in diameter, and most exquisitely polished. The substance itself exactly corresponds to Pliny's description, being a reddish purple, diversified with pure milk-white, the colours intermingling in the most intricate patterns. The stone is indeed a China Agate: for Agates present all possible varieties of colour; they occur with shades of the Sapphire passing through their white, or with well-defined bands of the brightest opaque tints: but the sort first mentioned has

the best claim to be declared the true Murrhina. I have myself remarked all the changes noticed by Pliny, in a large Agate *trulla*, the colours being a partly transparent, partly opaque white, slightly opalescent, spotted with chocolate-brown, all going through the most singular changes as the light is allowed to pass through the sides at different angles. And what strongly supports this view is the fact of so many antique glass bowls and saucers being found both whole and in fragments, which are very exact imitations of darkly-clouded Agates: for Pliny expressly mentions (xxxvi. 66) amongst the varieties of coloured glass manufactured in his day, one counterfeiting the Murrhina. A conclusive proof this that the latter substance was not artificial: indeed Pausanias, speaking of the water of the Styx (a most deadly and subtle poison), says (viii. 18) that it breaks to pieces glass, crystal, murrhina (μορρία), and all else made by man out of *stone*. Besides, owing to its common use for the most approved kind of drinking-vessel, it came to be designated absolutely as "Gemma," and the "potare gemma," so frequent in Martial, signifies this alone; "gemmati calices," on the other hand, implying gold set with other gems.

Pliny, however, could not have been mistaken as to the real character of the substance; for he states that Pompey brought it to Rome both in the rough and worked up into vases (lapides et pocula); which he dedicated to the Capitoline Jupiter. Now Appian records that 2000 vessels of the "gem Onychitis" formed part of the treasures of Mithridates captured at Talaura, which shows that the Greek *Onychitis* (not Onyx) was the same as the Roman Murrhina, for Pliny expressly says that it was their conquest of Mithridates that first set the Romans mad after gems and Murrhina.[1] Inasmuch as the district producing the stone

[1] These Onychitis vases were mounted in *gold*; a sure proof they were not of the common Alabaster originally so termed. "Murrhina" was most likely the native term for the stone, and adopted by the Romans for the sake of distinction. Posidonius the philosopher (quoted Ath. xi. 89) seems to be describing the same as ὀνύχινοι σκύφοι, of which there were found "nests," συνθέσεις, up to the size of two cotylæ (nearly a pint). These small dimensions, quoted as extraordinary for magnitude, equally prove that the precious Onyx, or some such stone, is here intended, not the common Oriental Alabaster, obtainable of any size.

was within the dominions of this king, it was to be expected he should have engrossed the finest specimens of the worked-up mineral. Immediately after this it came into general use in Rome for dishes, or rather plates for food (abaci escarii), a form for which it was best suited in consequence of the thinness of the layers. Pieces, however, were obtained of extraordinary superficial dimensions, for among the rarities displayed in Pompey's triumphal procession was a draught-board, four feet long by three wide, formed out of only two slabs (e gemmis duabus), a magnitude never afterwards to be obtained, or anything like it. For the size of the pieces in Pliny's days was never beyond that required for a small dish, and the *trulla* especially particularised as the usual form of vessels in this substance exactly resembled both in size and shape a modern breakfast-saucer. In spite of their high price, these vessels were accumulated in vast quantities by wealthy amateurs. Those belonging to a single noble—(Annius, once Consul), notorious for having paid 70 sestertia (700*l.*) for one cup, which certainly, remarks Pliny, did hold three sextarii (pints)—being confiscated by Nero upon the owner's death, were sufficient when set out for public exhibition to fill a theatre of considerable extent situated in the palace-gardens. Amongst these were the fragments of one bowl (scyphus) of unprecedented rarity, which, to make the world lament, and to cast odium upon Fortune for her malice in breaking it, the imperial connoisseur decreed should be preserved in a case, and thus exhibited, like the corpse of Alexander the Great. But the celebrated Petronius could boast of a single *trulla* valued at 300 sestertia (3000*l.*), which immediately before his suicide he smashed to pieces, in order, as Pliny quaintly expresses it, to disinherit Nero's table, and disappoint his expectations of so incomparable an ornament. "But the Emperor, as became his rank, outdid all by paying thrice that amount for a *capis* (a much smaller vessel). A memorable thing that an emperor, and a 'Father of his country,' should have drunk so dear!" But the fragments above mentioned as still occurring amongst antique débris indicate bowls of such incredible diameter as will account for the vast sums paid by enthusiastic collectors for rarities in this class.

I must venture here to differ from Winckelmann, who

(Pierres Gravées, p. 580) asserts his opinion that the Murrhine vases were the same as those cut out of the precious Sardonyx, in describing the portion of such a vase in Card. Albani's collection. But the two substances must not be thus confounded together, as a passage in Lampridius shows, recording as the extreme of licentious extravagance in Elagabalus that he used both Murrhine and Onyx vases for the basest purposes, "in Murrhinis et Onychinis minxit:" whence it is evident that they were distinct substances. The distinction was undoubtedly this: the Onyx-vases, in a stone of concentric layers, for the most part opaque and in strong contrast to each other, served as a medium for art, the surfaces of such vessels being always worked into cameo-designs. Such stones being usually more or less egg-shaped, these vases were deep in proportion to their width; and were infinitely more valuable than the Murrhina, which are always mentioned as not worth more than Crystal vessels. Thus Seneca (Ep. 123) talks of the wealthy having "mules to carry their vases of Crystal, Murrhine, and those engraved by the hands of famous artists:" meaning by the last silver-vases adorned with chasing.

The Murrhina, on the contrary, were, from the very nature of the material, always broad and shallow, dishes or saucers, not valued as works of art, but simply on account of the material: their price augmenting with incredible rapidity as their extent surpassed a certain limit. The best sort no doubt was that so minutely described by Pliny, of which the noble example in the British Museum is a perfect type, but all vases of Agate were afterwards included under the name; all that was required being that the material should be clouded with various colours, and not present the regular stratification of the Onyx. In fact, they were exactly the same as the Agate vases still imported from India, where the manufacture seems to be even yet going on, though in a languishing manner. At the sack of the palace at Delhi in 1858, whole chests full of such Agate vases are said to have been wantonly destroyed.

From the first dawn of the Renaissance such vases were eagerly sought after by the wealthy Italians, and imitated by their own artists, and the prices paid for them remind us faintly of the Roman extravagance in this particular. The Agate vases of the French Crown were valued in the last century at half a

million of francs. Their value at the present day, however, is greatly fallen; they indeed fetch much less in London than their first cost in India.

That many of the Roman drinking-cups in coloured glass were designed as imitations of the Murrhina is manifest from their shape, that of a shallow bowl, a form adopted of necessity by the former, but by no means indispensable to the latter substance. Though in many of these bowls the glass-worker has contented himself with exactly reproducing the dark-brown and the white clouds of the original, yet as frequently has he aimed at surpassing Nature by mixing up the most brilliant tints his laboratory supplied in elegant waves and concentric circles. Fragments of the latter are collected by the Roman gem-dealers, who cut them into shape and polish them for setting in bracelets, where they appear as novel Agates, and excite the wonder of the mineralogist.

It is very probable that such vases were imported ready made from India, as we know that the Crystallina were: that they were then extensively used by the Indian princes, appears from the exaggerated account Philostratus gives of the dimensions displayed by the various vessels in a precious stone, so common in that region, so rare in Greece." In the Periplus of the Red Sea (written under Augustus), amongst the exports from Ozene (Ougein) are enumerated "Onyx-stones and Murrhina."

Besides their rarity the Murrhina had another recommendation, precisely the same that made the true Chinese porcelain so indispensable when tea-drinking was first introduced into Europe,—it contained a scalding liquid without itself becoming heated, and remained cool to the lips. Now, as the Romans were extremely partial to boiling drinks, mixing their strong thick wines with boiling water and honey,[2] this peculiarity of the substance was invaluable. This we learn from Martial—

> "Si *calidum* potas, ardenti Murrha Falerno
> Convenit et melior fit sapor inde mero" (xiv. 113).

Murrhina continued to be in request down to the close of the Empire, and legal writers are continually mentioning them as distinct things from vessels of glass or of the precious metals. In the Middle Ages the name came to signify a shape, not a sub-

[2] Hence the usual term for a tavern, Thermopolium.

stance, it would seem, in consequence of the most common make in which the antique substance appeared. Thus a *bowl* is termed peculiarly Murreus: old inventories have often the item "Murreus de argento."

When Chinese porcelain began to find its way into Europe, the learned, not knowing how it was made, seem to have agreed to call it Murrhina. Long before that time the Italians had their Porcellana (so called from the pounded shells entering into its composition), a mere glazed earthenware, the secret of which had been taught them by the Moors: hence afterwards "Porcelain" was improperly applied to the Chinese manufacture, though of a totally different nature. Thus Garcias ab Horto: "They find a green kind of Jasper, out of which Murrhina are made (called Porcellana) of so bright a green that they might be thought cut out of the Emerald: and such is probably the material of the Sacro Catino at Genoa. A Murrhine vessel of this kind was once offered to me for 200 pardoãs (rupees); had it been a true Emerald I could hardly have got the thousandth part of it for that sum."

Lambeccius figures (Bib. Imp., vol. i.) of the actual size a most elegant patera with twisted handles, designed in a pure classical style, and then (1665) believed to be hollowed out of one entire Emerald, although more than a foot in diameter, measured over the handles. This therefore must have been, like the Sacro Catino, formed in a brilliant green paste, for certainly no mere green Jasper could in that age have been mistaken for the true Emerald, especially in Vienna, the school of the most learned amongst the early mineralogists. The Imperial Library *then* boasted of the most magnificent example of the true Murrhina ever produced by ancient skill, or preserved, as a most sacred treasure, protected also by superstition, through all the intermediate ages between the Roman and the Hapsburg Cæsars. Lambeccius calls the material Oriental Agate, which exactly agrees with the foregoing definition of the real signification of the name Murrhina. The form was a patera with elegantly twisted handles, and much resembling the Emerald vase in general design; but the size was perfectly incredible, the diameter over the handles measuring a Viennese ell all but two digits (about 27 inches). This also, to remove all doubt, is given

of the full size upon the same enormous folding plate. But what then gave it supreme importance, and probably had conduced chiefly to its preservation through the wreck of ages, was the inscription, "not made by hands," but traced by the finger of Nature (as L. states, and evidently in good faith),[3] in the colours of the stone, B. XRISTO. RS. XXX., interpreted as "Christus Beator Orbis." To produce the effect of natural shades in the substance these letters must have been traced with nitric acid which leaves a slight opacity where applied, of which there is an example (Marlborough), the name and titles of a former owner, ANDREAS CARRAIA, traced round the edge of a singularly fine Cameo (Constantine with helmed head). The mixture of Greek and Roman capitals betrays a Byzantine date, and refers to the consecration of this unparalleled relic of imperial splendour to the service of the Altar. No tradition is recorded of its origin: but as it had been "for many centuries" in the same possession, everything leads to the belief that it found its way to Vienna after the Frankish conquest of Constantinople, when so many grand Camei became dispersed throughout Europe. The existence of such a natural prodigy as a slab of Agate of the dimensions this patera demanded renders the vast prices given for similar rarities under the Cæsars no longer a thing to be wondered at. The shape of this is precisely that of the trulla, and of the class of vessels more peculiarly formed out of the Murrhina, as its natural capabilities dictated. The Emperor Leopold II. exhibited this Agate to Lambeccius as the most important of all his treasures; but to him also the miraculous inscription constituted its principal value.

The front of the altar in the Chiesa del Jesu, Rome, is formed of one slab of Murrhinum found in the ruins of an ancient house in the Forum. "It answers the description in Pliny very well. It is purple in colour, with strata of a dull white running through it: on the edges of the white there is a slight iridescence. It bears a resemblance to fluor-spar, but it is *not* fluor, for, as Sibilio at Rome showed me, fluor-spar is easily scratched, whereas the so-called *Murra* cannot be scratched, more particularly in the *white*."—(H. M. Westropp.)

[3] Adding, "Though man be silent, the very *stones* proclaim God's glory!"

NAXIUM: Σμύρις: Σμίρις: *Emery.*

ALTHOUGH the use of this mineral is coeval with the first invention of gem-engraving, which indeed in its proper sense cannot be effected without its aid, yet the earliest mention of it by a specific name is that in Dioscorides (a contemporary of the Triumvirs), who has (v. 165), "The Smyris is a stone with which gem-engravers polish the gems." Theophrastus (44) mentions the use of the mineral, but appears not to have had any distinctive denomination for it, his words merely being, "And again, the stone wherewith they engrave signets is the same as that of which whetstones are made, or else similar to it, and the best kind is brought from Armenia."

The very chapter in which Theophrastus had given some details of the process is unfortunately one of the most corrupt in the whole treatise; but it may be gathered from what remains that he expresses his surprise that the substance in question can be cut up and shaped by a steel tool, and yet can bite upon gems that the steel would not touch.

Ακόνα with the Greeks, as *Cotes* with the Latins, were terms used indifferently to denote the substance with which steel-tools were sharpened and hard-stones engraved, inasmuch as a piece of compact Emery was employed in both cases and in much the same manner as a file, not as now in powder applied by another mechanical contrivance. Dioscorides prescribes (v. 167) "the dust rubbed off a Naxian whetstone by the steel sharpened upon it." Pliny, after stating (xxxvi. 10), "For polishing marble statues, and also for engraving and *filing down* gems, the Naxium long held the first rank; thus are called the whetstones (cotes) produced in the isle of Cyprus," and (xxxvii. 32) "the Peridot is the only precious stone that yields to the file, all the others are

polished by means of Naxium and whetstones:" after this, when he comes to treat (xxxvi. 47) of the whetstones used for tools, he repeats the same observations as to the Naxian, and the superiority of the Armenian. In xviii. 67, § 5, he mentions the ancient Italian mowers as knowing no other whetstones than those brought from Crete, and places beyond the sea. For these oil was necessary, and therefore the mower moved along with a horn-full of oil tied to his leg. But Italy afterwards supplied whetstones which required water alone, and acted like a file upon the scythe.

For marble-sawing the best sand was imported from Ethiopia, the next quality from India, "peteretur etiam in Indos quo margaritas quoque peti severis moribus indignum erat" (xxxvi. 9). This must have been Emery-powder; and the fact of its being sought in Ethiopia is a very good reason for supposing its use known to the old Egyptians, and confirms Sir G. Wilkinson's explanation of the manner in which their primitive sculptors contrived to master the most obdurate materials.

Those primeval monuments of gem-engraving, the Assyrian cylinders in Loadstone, sufficiently explain Pliny's expression of *filing* a gem, the designs having evidently been cut into the circumference by rubbing with the edge of a fragment of Emery. It is in a more advanced period of Assyrian art that we perceive the neatly turned and regular indentations marking the application of the drill. The backs also of most really antique intagli of all periods show by the deep furrows upon them, but partially concealed by the lustrous polish subsequently imparted, how the gems had literally been *filed* into shape by the rubbing with an Emery-stone.

Hence we discover why Armenia should be famous for the production of the best material for this purpose; it was the source whence the inventors of the art drew their supplies of the indispensable means. As the knowledge of gem-engraving spread from Assyria towards the coast of Asia Minor, the artists carried with them a supply of the Armenian mineral. Theophrastus shows that in his days it was still imported from that region into Greece, although the isle of Naxos then as now possessed inexhaustible mines. From the preference given by

the Greeks, at the time when the art had reached its highest point amongst them, to the Armenian kind, there is reason to suspect the latter was a purer Corundum than the Naxian, and therefore more efficient in engraving. Modern times supply an analogous case in the same process. The Adamantine Spar, when introduced shortly before 1790 (Raspe) into the European lapidaries' ateliers from India, where it had been known from time immemorial, was eagerly received and immediately adopted universally as an enormous improvement upon the old-fashioned Emery-powder. It is self-evident that the Greeks would not have taken the trouble to import from a vast distance, Armenia, precisely the same mineral as they were at the very time obtaining from their immediate neighbourhood, Naxos, with the smallest expenditure of labour, and in any quantity required.

The process known to the most barbarous tribes of primeval times, that of drilling holes through stones by the perpetual turning of a stick constantly supplied with sharp sand and water upon the same point, has left us many memorials in the Celtic axe and hammer heads, where the shape of the widely-splayed haft-holes plainly indicates the agents brought into play. These are abundant in regions which do not produce Emery; but sharp sand, aided by the unlimited expenditure of time, effects the same result.[1]

The Assyrian gem-engraver soon perceived the advantage to be derived from an instrument that could hollow out his figures in hemispherical indentations, exactly formed to the size required, in addition to the simple straight cuts which alone he could produce by the original method of filing with the fractured Emery. The perforations traversing the length of all these cylinders prove that already, as soon as they were invented as signets, the principle of the drill was well known. These holes are bored so truly that we discover not merely that they were done with a metal wire, instead of a stick, charged with emery and oil, but that this wire must have been turned by means of a

[1] The Mexicans had no iron, the New Zealanders no metal whatever, yet the former cut the Amazon-stone, the latter the Jade, both amongst the hardest stones known to the lapidary, into the most elaborate and highly-finished monsters.

bow, in order to work so evenly, and not to run the risk of splitting the cylinder. It could not have been long before the engravers discovered that the same principle applied by means of blunt points varying in thickness would enable them to sink almost the whole of their design with extreme accuracy, only requiring a slight finish from the cutting medium. Hence many of the neater Babylonian class exhibit in their mode of execution as extensive, or rather exclusive, employment of the drill, as marks the largest proportion of the Etruscan scarabæi, which still retain the stamp of their Asiatic origin in their manufacture, though not in their subjects.

It must be here explained, that the metal point takes no part in cutting the stone, but merely serves as a medium in which the acuter particles of the pounded Corundum embed themselves, and bring an infinite number of cutting surfaces, continually renewed, to bear upon the stone. The softer the metal the larger proportion of these cutting particles does it take up and carry; hence a bronze drill will work faster than one of steel. The modern gem-engraver sets all his drills and cutting tools, however differently shaped, to work, by making them revolve horizontally by means of a lathe driven by the foot whilst he presses the gem cemented into a handle against the cutting edge. These cutters are, as they are wanted, fixed in a spindle driven by the *wheel*, whence the name of the entire contrivance. On the contrary, the ancient engraver, reversing the operation, brought his drills to bear upon a fixed surface, and turned them merely by means of the bow moved by his right hand, whilst he directed the drill with the left. Thus only is it possible to understand how the ancients were enabled to work out those enormous camei, the extent of which presents difficulties insuperable by the modern process. More than one artist could thus have laboured simultaneously upon the same slab of sardonyx, the simple drill and bow requiring so little room for their application. Indeed every really antique cameo shows distinctly how the superfluous parts of the upper stratum have been excised by means of circular perforations.

Sir G. Wilkinson is also of opinion that the Egyptians performed their stupendous sculptures in basalt, granite, and other

hard rocks, which now speedily turn the edge of the best steel chisels, by using bronze tools constantly supplied with emery-dust, the tool serving only as a medium for driving the cutting particles into the stone. The interior of the hieroglyphics certainly has every appearance of having been *bruised* in by some such application. It will be noticed that Pliny mentions the employment of the same mineral in polishing statues as in engraving gems.

There is a Rabbinical tradition testifying to the extreme antiquity of the employment of the *Smyris* in gem-engraving. Moses, they tell, engraved the stones of the Rationale by means of the blood of the worm Samir, so powerful a solvent as to subdue the hardest gem, and leave a hollow wherever the characters had been traced therewith. In after ages, when Solomon was about to build the Temple with stones untouched by the tool, the source whence Moses had obtained the Samir had been lost in the darkness of antiquity. But Solomon's wisdom speedily suggested a method for its recovery. He enclosed an ostrich-chick in a glass vase and set a watch upon it; the parent, finding it impossible to break the vase by force, flew off to the desert, and returned with a supply of the wonderful reptile, the application of which speedily dissolved the glass and released her chick. By repeating this stratagem, a sufficient supply of the potent menstruum was obtained. The root of "Samir" is evidently the same as that of "Smyris;" and there is another point of analogy between the significations. Samir is explained by some Rabbins as meaning the Diamond or *Adamas;* now it is almost demonstrable that the Adamas of the early Greeks, before the Indian Diamond had found its way among them, was every kind of Corundum, whether precious stone or instrument of art. The Jews, whose artists were all called in when required from foreign nations, Phœnicia chiefly, had preserved a tradition of the use of *Smir* in the cutting of their famous Breastplate, and, with their usual love of the marvellous and the absurd, invented the rest of the legend. There seems, however, always to have prevailed a notion amongst Orientals that gems could be softened by chemical means: a trace of this appears in Pliny's repetition of the fable that the Diamond could only be broken after maceration in

goat's blood. Certainly to persons unacquainted with the art of engraving, the ability to sink designs deep and rounded in outline in the most obdurate of natural substances, gems, must have appeared miraculous, and only to be explained by the existence of some secret means for softening the hardness into a plastic consistency. Such a wonderful property would be naturally ascribed by an Oriental to the blood of a serpent or worm, creatures figuring so largely in magical operations. Hence we find the Indian Diamond first made known to the Greeks by Sotacus as the *Dracontias*, and only found in the serpent's head.

Earth-worms indeed are recommended as a menstruum for softening glass by Heraclius, who wrote a treatise, 'De Artibus Romanorum,' probably in the seventh century, in a barbarous and often unintelligible jargon. However, if we choose to believe his assertion,

"Nil tibi scribo quidem quod non prius esse probassum,"

the following recipe would decide the question:—"Collect fat earth-worms as turned up by the plough, vinegar, and the hot blood out of a big he-goat fed on strengthening herbs; mix all together, and so anoint the bright shining bowl, and then engrave upon it with fragments of the hard stone called Pyrites." This was the method, he prefaces, directed by the art. (See VITRUM.)

OBSIDIANUM: *Opsianum*: Λίθος Ὀψιανὸς.

This substance, a vitreous lava, whence its old name "lava-glass," was called after a certain Obsidius or Opsius, who first discovered it in Ethiopia (xxxvi. 67). It is extremely black and sometimes translucent (in thin pieces), and, inlaid in chamber-walls in the form of mirrors, it reflects shadows instead of images. By a strange coincidence, the Peruvians, when first discovered, had Obsidian mirrors in general use—"many persons make signet-stones out of it." This fashion does not seem to have lasted long, for antique intagli in Obsidian are extremely rare. There was, however, in the Praun Collection a Cock-Chimæra, on a large Obsidian, with a Gnostic design on the reverse. The Black Agate may be distinguished from this stone by the character that, however deep its colour, it always exhibits a reddish translucency when held up against a strong light; the Obsidian, on the contrary, where translucent is colourless.

Pliny had seen figures in full relief of Augustus sculptured in it, the substance attaining sufficient dimensions to allow of this employment;[1] and the same emperor had dedicated in the Temple of Concord, as being something wonderful, four elephants cut out of Obsidian; their size, however, is not stated. Tiberius restored to the worship of the people of Heliopolis a statue of Menelaus, which had been found amongst the property of a certain former governor of Egypt (who appears to have appro-

[1] "Capaci materia hujus crassitudinis." Pliny seems, however, to distinguish the stone from the gem in a subsequent passage (xxxvii. 65): "Of the stone Opsianus we have already treated in the last book: gems also are found of the same name and colour, not only in India and Ethiopia, but in Samnium also, and as some think in Spain, on the beach of the ocean there."

It is very probable he has here in view the fine black opaque ring-stone, now known as the Black Jasper.

priated it in the Verrine fashion), which Pliny quotes as a proof that the stone had been used in sculpture long before its pretended discovery by Obsidius. According to Xenocrates it was found not merely in Ethiopia, but in India, in Samnium, and in Spain, upon the Atlantic coast; and in this the Greek was doubtless correct, for it is commonly found in the vicinity of all volcanoes, the chief deposits known at present being in the Lipari isles and under Mount Hecla.

In Pliny's time it was largely imitated in glass, employed as a material for plates and dishes. A similar black glass was a favourite material in the last century for making pastes after antique gems, which renders it often difficult to distinguish the antique engravings in the real Obsidian from these modern fabrications, unless by the test of the file. For Obsidian, notwithstanding its vitreous origin, possesses the hardness of the Garnet, and its splinters will deeply scratch into the surface of any paste.

There was a curious pedantic error prevalent in the same century of calling all antique pastes *Obsidian*, merely because Pliny had mentioned the imitation of this particular stone in glass. But Pastes, generally, are termed by him "vitreæ gemmæ, used for setting in the rings of the populace" (xxxv. 30).

Orpheus (282) prescribes "the stern Opsian stone" as an ingredient in a curious magical composition. It was to be mixed with amber, "the tears of the pine," myrrh, and the flaky talc, when the compound would return oracles concerning all things about to happen, whether good or evil, and give to know whatever thou mayest desire.

The Mexicans are described by an early Spanish missionary as making razors and knives out of Obsidian with great dexterity. Holding the block between their two feet, they, with an instrument shaped like a musket-butt, struck off flakes. These, being mounted as an edge to a wooden sword, furnished a most terrible weapon, capable of cutting a man in twain by a single blow, after which, however, it became useless.

ONYX: Ὄνυχιον: Ὀνυχίτης.

The name of Onyx was given by the Romans to two totally distinct substances: a species of marble, and a silicious gem. Pliny states this (37, 24): "hoc aliubi lapidis, hic gemmæ vocabulum." As it would appear, from a circumstance hereafter to be noticed, that the marble was the first of the two to be known under that name to the Romans, it is properly the first to be here considered. It was the carbonate of lime, now called Oriental alabaster, and received its appellation from the fancied resemblance of its clearly defined white and yellow veins to the shades in the human finger-nail (ὄνυξ).

In the republican times of Rome this was a material of incredible value and rarity, supposed to be peculiar to Arabia, and solely employed for making drinking-cups and the feet of couches. Cornelius Nepos recorded that two amphoræ in this stone, as big as Chian wine-jars, exhibited by Lentulus Spinther, were looked upon as prodigies for magnitude, but so fashionable did it become, that only five years later he had himself seen columns 32 feet high in the same material. And Pliny notices (xxxvi. 12) that Balbus placed in his theatre four middling-sized columns of Onyx-marble, which were considered at the time an extraordinary ornament, whereas in the next generation he saw thirty, and larger ones too, in a single banqueting-hall built by Callistus, a freedman of the Emperor Claudius. Quarries of the stone had by that time been opened at Thebes in Egypt (whence in our times the late Pasha raised columns above forty feet long, which he presented to the fabric of S. Paolo fuori le Mura, Rome), also at Damascus, but the finest quality came from Carmania. Being considered as especially adapted for the preservation of the

unguenta or perfumed oils, then so much in use, it was worked up into the little vases called alabastra (or "without handles"), and hence becoming known as the alabastrites or "unguent-jar stone," lost its original designation, which thenceforward came to be confined to the gem, now to be discussed.

The first mention of the Onyx as a precious stone occurs in the inscriptions of the Parthenon, dating from the Peloponnesian War (B.C. 431–404), where amongst the offerings is registered "a *large* Onyx engraved with an antelope; weight 33 drachms." Theophrastus ('On Stones,' 31) uses the diminutive *ὀνύχιον*, indicative of its value, and also perhaps to distinguish it from the marble Onyx; and describes it as made up of white and dark-brown (*φαίῳ*) in alternate layers. This *ὀνύχιον* of Theophrastus and the early Greeks was not the stone known to the Romans and to us as the Onyx, or Nicolo, the Italian corruption of Oniculus, but the gem upon which the best archaic and Etruscan intagli for the most part occur, and which is now usually called the tricoloured or banded Agate. This appears from the description above quoted from Theophrastus. His definition of one of its shades as *φαῖος* is the very epithet Homer frequently applies to spring-water, and therefore can only signify something blackish and at the same time translucent, the actual appearance presented by water deep and clear. Totally inapplicable are these terms to the Onyx of the Romans, our Nicolo (oniculus), where the layers are opaque, and usually of vivid colours, blue upon black; but they exactly describe the stone usually but improperly called by dactyliographers the "Tricoloured, or Banded, Agate," that so favourite material for the early Greek glyptic art, and which those lapidaries invariably cut across the strata so as to obtain two bands of dark brown, one lighter than the other, and separated by one in the middle purely colourless and transparent. This stone it is evident enjoyed the highest reputation for the purpose of signets, until shortly before the rise of the Roman Empire, when the brilliantly coloured Indian Sard completely banished it from the fingers of the fashionable. As a proof of this, it may be safely asserted that not a single imperial portrait is known to exist in such a material. Equally into request with the Romans as the Sard came the Nicolo; a stone completely unknown to the Greek

engravers, as Caylus has observed, and the experience of all gem-collectors will confirm his observation.

Isidorus of Seville has noted that the old Latin name for a signet was *ungulus;* for which he offers the absurd explanation that it was so called "because the gem covers the ring in the same manner as the nail covers the finger-end." But there can be no doubt that *ungulus* was merely the literal translation of the Greek *ὀνύχιον,* its derivation from *unguis* exactly corresponding to that of the original from *ὄνυξ.* The Greeks used the diminutive to express that the native substance had been modified to the purposes of art, according to a well-known rule of the language, of which examples are *χρυσίον, ἀργύριον,* gold, and silver, when coined. For the tricoloured Agate being the usual signet-stone of the Greco-Italians and Sicilians, the Romans, when they began to obtain and to value the works of these engravers, at the same time adopted and Latinised the current designation of the stone. This explanation also throws light upon the apparently unintelligible definition of the Onyx extracted by Pliny from that most ancient mineralogist Sotacus, that "it exhibited the colours of the human nail, and also of the chrysolite, the sard, and the jasper:" and also the statement that follows, taken from Zenothemis, that the Indian Onyx presented "many different colours; fiery, black, and like horn, surrounded by opaque white veins like an eye;" and again that of Satyrus, that the same species was "flesh-coloured, having a part of the chrysolite, another of the amethyst" (xxxvii. 24). For these banded Agates, cut across their layers, often present the most beautiful and vivid colours in strongly contrasted juxta-position. Similarly the Sardonyx of the Greeks differed as much in appearance, though not in species, from that of the imperial Romans. Pliny quotes (xxxvii. 23) several Greek mineralogists, to the effect that by the Indian Sardonyx they understood a Sard with a white layer (candore in sarda), and both colours transparent. The opaque kind, which in Pliny's times he notes had engrossed the designation, they termed the *Blind,* and apparently held it in no esteem. It was in fact the same evenly stratified union of calcedony and jasper as their *ὀνύχιον;* with the distinction that its colours were white and red, not white and black: for

red was the proper character of the Sard. Pliny proceeds to give the reason for its universal use as a signet-stone amongst the Greeks upon its first introduction from India, because the soft wax used for sealing did not adhere to the engravings in this material, in which respect they excelled almost every other gem. He uses the word "initio," *at first*, in evident allusion to the total neglect of the gem in this capacity in his own times. For amongst the purely Greek and Etruscan works, the tri-coloured Agate is frequent, presenting its bands in sard-red and white as well as in the dark-brown and white of the original ὀνίχιον. This valuable property of the gem, its non-adhesion to the wax, is a sufficient reason why the Greeks should have adopted it for their signets, above all others, although its deeply-coloured and contrasted bands completely prevent the intaglio sunk in them from producing any effect to the eye. The signet, however, in those early ages was designed for use not ornament.

No better definition of the Onyx can be given than in the words of Hill (Translation of Theophrastus): "The zones are laid with perfect regularity, and do not, in the judgment of the nicest distinguishers of the present times, exclude it from the Onyx class, of whatsoever colour they are except red; in which case it takes the name of *Sardonyx*. The colour of the ground and the regularity of the zones are therefore the distinguishing characteristics of this stone; and in the last particularly it differs from the Agate, which often has the same colours, but placed in irregular clouds, veins, or spots."

Köhler, however, who has treated this question more fully than any other writer in his 'Untersuching über den Sard, den Onyx, und den Sardonyx,' basing his explanation upon the numerous and confused definitions of the Onyx, extracted by Pliny from various Grecian authorities, has arrived at a conclusion differing very widely from Hill's: "The question, how is the Onyx to be distinguished from the Sardonyx, is now easily to be answered out of Pliny. As far as regards the substance and the colours, both are one and the same stone. It is called the *Onyx*, when the red, brown, or yellow ground is covered by white veins irregularly and capriciously disposed. If therefore these veins formed sometimes stripes, sometimes spots, some-

times eyes, then was the stone the Onyx. But if the various colours of the stone lay in regular strata one over the other, then it became the *Sardonyx*." That the concentric arrangement of the veins was the peculiar distinction of the Onyx, appears from Pliny's brief notice (xxxvii. 71) of its variety now known as the Eye-Onyx: "Triophthalmus cum Onyche nascitur, tres hominis oculos simul exprimens." The fact being that in Pliny's age the name no longer bore the same acceptation as when Theophrastus used it, but was certainly applied to the stone now called the Agate. This is the only way of understanding the passages already quoted from Sotacus and Zenothemis, as to its various colours surrounded by white veins like an eye, and these again sometimes traversed by other white veins running athwart them; and the remark of the former that "the true Onyx presents numerous and differently-coloured veins with milk white zones, the transition of colours between them being perfectly indescribable, yet all blending into one harmonious whole, highly charming to the eye." It is singular, however, that Pliny should give no definition in his own terms, of what the Romans understood by the designation *Onyx*, but should have contented himself with citing these obscure descriptions of earlier and Grecian authors, being apparently himself in doubt as to the exact species of gem to which they referred.

Epiphanius, with his usual ignorance, confounds the marble with the gem Onyx: "Twelfth Stone (in the Rationale) the Onyx: this hath its colour exceeding yellow (*ξανθὴν*). It is said that the wives of the kings (of Persia) and of the nobles take great delight in this stone, and have it made into drinking-cups for their own use. Besides this, there are other sorts, similarly called *Onyclytes*, resembling yellow bee's-wax. And some pretend that such are formed by the condensation of water dropping. These are called Onychites (nail-stones) in natural history, because the finger-nail in well-bred persons is made up of two colours, a marble-white coupled with the appearance of the blood underneath, through the substance of the nail. Some, however, occasionally term marble Onychites, from the mode of testing it (by the finger-nail), or from the purity of its whiteness; but they are in error."

One passage, however, aided by tradition, will afford a clue for tracing the exact meaning of the name amongst the Romans, at least as far as regards the Arabian species. For this is described by Sotacus as differing from the others, in being black with zones of opaque white, whereas the Indian exhibited fiery spots encircled by transparent zones, either one or many around each, but differing from the same in the Indian Sardonyx: for in the former these spots are a shade (momentum), in the latter an actual circle. The only conclusion to be drawn from this observation is (with Köhler) that Sotacus called the irregularly stratified stone (our Agate) the Onyx, the regularly stratified the Sardonyx. Now the ring-stone most in favour with the Romans, next to the fiery Sard, if we may judge from the number remaining, and the good intagli they generally bear, is a stone of two horizontal layers, the lowest of them black sometimes opaque, but often red by transmitted light, covered by another extremely thin (Pliny's momentum) of milky-white, which from the reflexion of the dark ground underneath, often shows like a turquois-blue. This arrangement of colours was procured by cutting out one of the "eyes" above mentioned, together with its encircling zone, and thus carefully reducing it to the form best calculated to preserve the exact distribution of the two shades, by sloping off the sides but leaving the surface perfectly plane. The popular name for such a gem amongst the Romans was *Ægyptilla*, allusive to its origin, or rather the place of exportation: "Nomen a loco: vulgus in nigra radice cærulea facie." But the older definition quoted from Sacchus shows the name originally designated the Sardonyx cut across the layers, for the stone was distinguished by veins (bands) of Sard and black passing across a transparent white ground, "per album sardæ nigræque venis transeuntibus" (xxxvii. 54). Köhler supposes, with good reason, that this two-coloured gem is Pliny's Arabian Sardonyx, "which retained no trace of the Sard," for if the third and uppermost layer of the Sardonyx be removed, the remaining two will give us the very stone in question.

This is the Nicolo of the Italians, a corruption of Onicolo, a little Onyx, still called by the Germans *Onykel:* a traditionary name affording in itself a strong testimony that this was anciently

the Onyx *par éminence;* and as a diminutive presenting a curious analogy with the original name *ὀνύχιον*. A most absurd derivation for the modern name is current, that the stone was so called after a certain famous (and fabulous) artist Nicolò, who worked in it in preference to any other; equally ridiculous with that given by Camillo Leonardo from Nicolaus, in Greek the "conqueror of nations," in virtue of which designation it makes the wearer victorious in battle. A remark nevertheless valuable as testifying to the existence of the name Nicolo for this gem amongst the Italians of the 15th century.

This variety, or more truly, this method of cutting the stone and giving it its characteristic appearance, was unknown in Grecian art, the intagli occurring in it being invariably in the Roman style, and in style all posterior to the reign of Nero.

As an additional proof that the Nicolo was the Roman Onyx, we have the curious fact recorded by De Boot (writing on immemorial authority): "That sort of the Onyx is the first in value and estimation which is of a bluish tinge, having a black layer underneath; and is especially sought after by the Jews, for they have a constant tradition that this bluish Onyx was one of the number of the Twelve Stones, and therefore they reverence and value it highly" (ii. 111).

But to return to the definitions of the early Greek mineralogists. Such a species of many-coloured quartz as they describe, partly opaque, partly transparent, full of lines, eyes, and spots, would now be called an Agate, rather than an Onyx. Indeed Isidorus (Origg. xvi. 11), by a singular anticipation of the modern nomenclature, describes the *Achates* as "black, having in the middle white and black circles joined together and veined." Such a description exactly applies to that finest specimen of antique work in Agate anywhere preserved, the leopard's head in the Townley Collection, admirably sculptured in full relief, and as large as the head of an actual tom-cat:[1] the stone marbled

[1] The Opal eyes, which impart such life and ferocity, were, says Blumenbach, inserted by J. Pichler. The story in the Brit. Museum is that this head capped Tippoo Sahib's tent-pole; a tradition quite at variance with Blumenbach's notice, for J. Pichler died in 1791, and Seringapatam was not taken before May 4, 1799.

with shades of the purest black, white, and blue, forming spots and meanders fully verifying Pliny's expression, "colore inenaribili et in unum redeunte concentum suavitate grata." But in fact the Agate and the Onyx are the same substance, only differing in the arrangement of the layers, which in the Agate are wavy and often concentric, whilst in the Onyx they are placed parallel to each other.

Agathe-onyx is the name appropriately given by the French to that variety in which the upper layer is opaque and white, the lower transparent, and either colourless or a pale-yellow. This is the material most frequently employed for modern camei, being the production of Europe, and often termed the German Onyx, whereas the ancients preferred almost exclusively for that purpose the opaque and rich-coloured strata of the Indian Sard-onyx. Reversing the rule of modern camei, in the antique the relief is usually in opaque white upon a *black* ground. There is also a substance closely resembling the Agathe-onyx in appearance, though much softer when tested by the file, and often to be met with employed in Italian camei of the Renaissance, the *Albâtre-onyx* of the French. This is but a variety of the Oriental Alabaster, with the difference that the opaque and the transparent layers, instead of intermingling in circles and curls, are arranged in well-defined horizontal layers. The Italians have also skilfully forged the antique Onyx by cutting out a relief in the white lava, so much used for Neapolitan ornaments, and fusing this down by means of an enamel upon a ground of brown Agate: a deception extremely difficult to detect. Bruckmann mentions a singular variety in his own cabinet; an antique cameo, where the upper layer was calcareous, effervescing with acid, the lower a pure transparent quartz.

The most important works of the ancients remaining to us in Onyx, are their vases of different forms, which have ever been prized as the chiefest ornament of imperial and royal treasuries; enjoying, if possible, a higher estimation in mediæval times than amongst their original possessors. The earliest notice extant of Onyx vases occurs in Appian (Bell. Mith. 115), where he enumerates amongst the treasures of Mithridates captured at Talaura, 2000 vessels of Onyx (λίθου ὀνυχιτίδος), that is, of the *gem* not

marble, as the feminine gender of the noun proves (indicating according to the genius of the language, a *precious* stone), as well as the notice that these vases were in gold mountings. These seem to be the same collection as what Posidonius describes as Onyx bowls, found in *nests*, or sets, up to the capacity of two cotylæ (nearly one pint). These comparatively small dimensions also serve to prove that the precious Onyx, equally with the Agate Murrhina, is here intended, for in the alabaster so-called vases of the most enormous dimensions are easily procurable, as the splendid productions of the Voltura fabrique amply manifest in our own times. Epiphanius, as quoted above, speaks of the Oriental princesses as delighting in drinking-vessels cut out of the Onyx. The treasures of Mithridates came to him in part from the inheritance of his ancestor Darius Hystaspis, in part had been amassed by the Ptolemies, and recently given up to the Pontic king by the Coans, in whose safe keeping they had been deposited by Cleopatra Selene. The greater part, however, was due to his own collecting, which he had prosecuted with unremitting zeal.

Veltheim (Onyx-gebirge, p. 75) correctly supposes that such vases were cut out of nodules (nieren), made up of concentric layers of Jasper and Calcedony, like the well-known Agate nodules. The ancient artist, adapting the form of his vase with admirable skill to the natural disposition of the strata in the stone under his hands, obtained a white coating over the coloured body of the vase through which he cut down, thus producing designs in cameo. As works of art, these vases possess considerable merit; but infinitely more extraordinary are they, regarded as mineralogical specimens, as will appear upon the consideration of the dimensions of the principal examples preserved. Of these, the most famous is the "Cup of the Ptolemies, a *carchesium*, or two-handled vase, holding a sextarius (above a pint), being 4¼ inches high, by 15½ in circumference, measured over the handles. It is covered with masks, vases, and other Bacchic emblems, admirably executed in relief; and hence its popular appellation, from the notion based upon these embellishments, that it must have been executed for Ptolemy XI., surnamed Dionysos. The style, however, is much more that of the times

of Nero, a great dilettante, as Pliny records, in murrhine and crystal vases; in fact, on one of his coins (in small brass), the reverse presents a table supporting similar symbols, and altogether recalling the ornamentation of this carchesium. By a singular coincidence, we find here a Dionysiac utensil dedicated to the service of a St. Dionysius, and reverting to its original destination. For after its presentation in the ninth century, by Charles the Bald to the abbey of St. Denys, it was thenceforward used, according to the tradition preserved by Marion du Mersan, to hold the consecrated wine at the coronation of the queens of France. Its gold mounting bore a legend, added at the time of its dedication:

> "Hoc vas Christe tibi devota mente sacravit
> Tertius in Franco sublimis regmine Carlus.

It was stolen in 1804 from the Musée, and its gold mounting enriched with gems melted down by the thieves; fortunately they were arrested in Holland, and the vase recovered undamaged; and it has been elegantly remounted by Delafontaine. One fact shows the high value formerly set upon this relic: Henri II. pawned it to the Jews of Metz for a million of livres tournois (50,000*l.*), equivalent to five times that amount in modern currency.

Next in importance amongst these relics of imperial splendour comes the Farnese Tazza, a *scyphus*, or flat bowl, cut out of a single piece, eight inches wide by two deep, and carved with a subject in the Egyptian taste, allusive to the influence of the Nile. It is said to have been discovered in the *penetralia* of Hadrian's Mausoleum, when explored in the 16th century. It was purchased for 10,000 ducats, and has long adorned the Museum at Naples; a memento of the Farnese Princes of Parma.

Still more famous from its history is the Mantuan, or Brunswick Vase, an *alabastron*, or tall perfume jar, with narrow neck, five inches high by two in the greatest diameter. The relief upon it refers to the Eleusinian Mysteries, representing Ceres with Triptolemus in her dragon-borne car, three votaresses with their offerings, and the exergue filled up with masks and other Bacchic symbols. The style indicates, in the opinion of the most competent judges, the age of the Antonines, the middle of

the second century. It has been tastefully mounted in the Cinque-cento style, with a base and spout to convert it into a rose-water ewer, according to the usage of that period. It had long adorned the famous Gonzagu Gallery at Mantua, until, in the lamentable four days' sack of that city by the Imperialists in 1629, it fell into the hands of the Duke of Brunswick, one of the chiefs of the German robbers. The value formerly set upon it was 150,000 thalers, half which amount is said to have been frequently offered for it to its then possessor. The Vienna Cabinet possesses another alabastron, similar in shape to the Mantuan, covered with reliefs of masks and Bacchic ornaments; but bearing a dedicatory inscription, a verse of Anacreon's, showing it to have been made for a present to a lady of pleasure.

Other alabastra in Onyx, though unadorned with camei, were long treasured in the French cathedrals, and devoted to their original purpose of holding (the consecrated) oil. A magnificent specimen of the stone, formerly belonging to the cathedral of Sens, is now in the possession of Mr. J. Webb.

Such alabastra were occasionally used by the Romans as wine flasks, in order to impart their perfumed flavour to the liquor; Martial notes (xiv. 110), "Ampulla Potoria"—

> "Hac licet in gemma quæ servat nomina Cosmi
> Luxuriose bibas si foliata sitis."

The Onyx is enumerated amongst the articles of export from India early in the first century, by the author of the 'Periplus' of the Red Sea.' Thus he mentions "the city called Ozene (now Ougein), whence all things necessary to the natives are brought down to Barygaza (Barcellone, on the Gulf of Cambay), and also articles pertaining to the trade with us; namely, stones, the *Onyx* and murrhina, Indian cloths—fine and common quality, &c." Again he has: "from the same places are exported nard, zedoary, assafetida, ivory, Onyx-stones, &c. To Barace (Baroach) are brought pepper, many fine stones; also various and numerous kinds of lustrous gems, the diamond, the hyacinthus, &c." Further on he specifies the exact locality producing the Onyx: "From Plythanæ (Pultanah) *Onyx-stones* in abundance, from Tagaræ (Dowlatabad) much common cloths, &c., all which are

brought down to Barygaza." Under the Ptolemies, the Indians themselves brought their own commodities to the city Eudæmon on the Red Sea, where they met the Egyptian traders as at a common entrepôt, like Alexandria in later times. But this place, notes our author, had been recently destroyed by Cæsar. Two centuries and a half later, we find from Vopiscus (Aurelian III.), Firmus, a merchant of Alexandria, who usurped the purple in Aurelian's reign, had ships of his own trading direct with India. Scythicus also, to whom Epiphanius ascribes the true authorship of the heresy of Manes, was an Arabian trading regularly between Alexandria and the Indian coast.

Both the Onyx and the Sardonyx are now largely imitated by artificially preparing the German species, a stratified quartz, in quality little superior to common flint, by which treatment stones are produced of much beauty, exhibiting well-defined and even layers of black and white, or red and white, equally clear and vivid. This is effected by boiling the stones, for the space of three weeks, in a solution of honey, in water constantly replenished as it evaporates, and afterwards steeping them in sulphuric acid to bring out the black and white; in nitric for the red and white colours. The more porous strata imbibe the honey first, and then the acid that carbonizes it—the more compact remaining unaffected by either. Such imitative gems are of no value, being imported in vast quantities from Germany, where the secret was either discovered some years ago, or else, as others assert, introduced from Italy, where it had been practised from time immemorial. Pliny himself notes that *all gems* are brightened up by boiling in honey (mellis decoctu nitescunt), especially in Corsican, noted for its acridity, although all other acids are detrimental to them (xxxvii. 74); and Barbot states (but without giving his authority) that the Indians still improve the colour of their Carnelians by roasting them in earthen pots after an exposure of several weeks to the heat of the sun. There is a very curious passage in Pliny, in the same chapter, bearing directly upon the use of honey in the treatment of gems:—"The Cochlides, now a very common gem, is rather an artificial than a natural production. It is said to be found in Arabia in large masses; and after a boiling of seven days and nights continuously

in honey, in order to purge away the earthy dross, the residuum is arranged, according to the fancy of the artist, in veins, lines, and spots of various colours, in the manner most likely to attract purchasers. Of such a size have these gems been produced as to serve for frontlets for the horses of Eastern kings, and for pendants to their trappings." What is meant by this description it is impossible even to conjecture. It may after all be merely a jeweller's story to account for the whimsical conformation of the veins and shades in the Agate; or still more in the wonderfully beautiful pastes produced by the Alexandrian glass-workers. The name "Cochlides" indeed signifies "snail-shell stone;" and such is the literal meaning of the Italian *Lumacella*, a black marble full of fragments of nautilus-shells, flame-coloured and glowing as if actually in a blaze. It is therefore possible that both terms, the ancient and the modern, apply to the same substance, which from its beauty as well as singularity must ever have been admired as soon as known.

It is true that certain species of the antique gems, such as their best Sards and examples of the Onyx and Sardonyx, are incomparably superior to anything of the kind that is to be met with in nature at the present day; but it would be presumptuous to ascribe this excellence to any artificial treatment of the subject-matter by the ancient lapidary. Much more reason is there to suppose it the result of their better and more abundant supply from a variety of sources now closed to us, such as Ethiopia, continually referred to by Pliny as producing the choicest gems. Such we know was the case with many of the ancient fine-coloured marbles, only known at present as existing in the remains of Roman magnificence: such as the Rosso, the Nero, and the Giallo Antico, all from Numidia; the Paonazzo or Synnadic, from Phrygia, &c. Numidia and Ethiopia, perpetually quoted by Pliny as exporting marbles and gems of all kinds, are now completely lost to the trade, as are also the equally productive mines anciently skirting the Red Sea.

To return to the artificial colouring of gems, it is ascertained by experiment that those belonging to the species of translucent quartz, which have been rendered white and opaque by the action of fire, will in a great degree recover their original colours

by immersion in hot water. This fact is strikingly exemplified in a tricoloured Agate belonging to myself, of which the two darker bands are completely calcined and chalk-like, yet these, after a short soaking, again become two shades of brown, and as translucent as ever. Winckelmann has noticed the same transformation in a stone (P. G. de Stosch. No. 1123) engraved with an Apollo, which from white and opaque becomes brown and transparent after having been worn a few hours upon the finger, in consequence of the penetration of the perspiration of the skin into its porous substance. Not being aware of the cause, he supposed the gem to be a Hydrophane or Oculus Mundi, a kind of Opal which goes through a similar change if saturated with water. Similarly another gem of mine, a fine Sard, engraved with a head of Sapor II., filled with white spots owing to a partial calcination, recovers its pristine pure crimson after a few days' wear on the finger.

Ben Mansur describes the Onyx (Dschesi) as divided into two species:—The *Bakrawi* of three layers: the first, opaque red; the next white; the third, transparent like crystal: and the *Habeschi*, also of three layers—two dark, and a white one between them (the actual ὀνύχιον of the Greeks). "Some are striped, others are not; in others the stripes are so interrupted that they form curious figures." Interesting also is his notice of the localities yielding it:—"Although the Onyx is found in many places, yet those most valued are dug up on the confines of India and of China." From which it appears that, like the early Greeks, he makes no distinction between the Onyx and the Sardonyx.

In the same measure as the Alexandrian glass-workers counterfeited with astonishing success the natural clouds and polished surface of the Murrhina, so did they reproduce with equal skill, in their cheaper material, the precious Onyx vases and the cameo designs embellishing their surface. This was effected by fusing an opaque white coating over the coloured body of the vase; and by cutting this away where required, the design stood out in relief, usually upon a dark-blue ground. The process, as the marks of the graver show, was precisely that employed in cutting cameo in hard stones. Fragments of large vessels thus adorned are frequently met with amongst ancient ruins. Of the perfect the

Portland Vase is the most famous specimen; and next to this the Neapolitan, covered with an elegant arabesque of interlaced vine-branches. These ambitious attempts are aptly termed by Martial, "audacis plebeia toreumata vitri,"—*toreuma* being the technical name for ornamentation in relief, especially when executed upon the surface of vases, whether in metal or in stone. Another epigram (xiv. 115) informs us that the seat of this manufacture was Alexandria, and that the risk of breakage during the operation was very great, as might well be concluded from the fragility of the material:—

> "Aspicis ingenium Nili quibus addere plura
> Dum cupit, ah! quoties perdidit auctor opus."

Yet the greatest artists of the day did not disdain to exercise their taste upon so valueless a material, for the relievi on the vases above mentioned are far superior to any decorating the celebrated vases on the real Onyx. This application of the art appears to be referable to Nero's times, as may be deduced from Pliny's observation (xxxvi. 66), that a mode of working glass (arte vitri) had then been discovered which made two small cups of the kind called *pterotæ*, or two-handled, sell for 6000 sesterces (60*l.*). So large a price could only have been commanded by their artistic excellence, and not for any novelty in the colour or body of the material; for the circumstance is analogous to the prices quoted repeatedly by the same author (xxx. 35), as paid for silver chasings by celebrated artists. Similarly Apuleius (Met. ii.), in describing the banquet given by the wealthy Byrrhena, enumerates "ampli calices variæ quidem gratiæ, sed pretiositatis unius. Hic, vitrum fabre sigillatum, ibi crystallum impunctum, argentum alibi clarum atque aurum fulgurans, et succinum mire cavatum in capedes ut bibas." Here it will be observed he makes the glass vessels to be adorned with figures in *relief*, the crystal with such in *intaglio*—a distinction confirmed by all the specimens extant in either kind.

De Boot states that the species composed of black and white layers was commonly forged in his times (the 16th century), in order to be sold for a real cameo, in the following curious manner (ii. 94):—"Take the little sea-shells used by the Italian

women for paint (pearl-powder?), grind them fine; then steep the powder in lemon-juice, frequently passed through a filter, so that the juice be three or four fingers deep over it. Let the mixture stand thus, well covered over, for ten days in a warm place; then pour off the juice; wash the residuum in water; grind it up in a porphyry mortar with white of egg well beaten up beforehand; then cast the cement in moulds of the required design, made in wax. Next polish with great nicety the rough back of these casts, so that they may be applied skilfully and neatly upon a black ground, that the deception may not be readily detected. In rubbing down the shells, other colours can be added in fine powder, so that the Sardonyx may be imitated in this way as well as the other precious stones."

Georgius Agricola (d. 1485) has a passage interesting as showing how rapidly the newly-revived art of gem-engraving had found its way into Germany:—"Nowadays, in the opaque white crust of the German Onyx (Agathe-onyx), engravers cut the coats-of-arms, the pride of noblemen, because this stone has veins more translucent than any other of the same kind, and moreover is harder than rock-crystal. They also paint the *back* of these coats-of-arms with the proper *tinctures* required by the armorial bearings."

The Onyx, strange to say, considering its high repute in ancient times, bore a most unfavourable character in the Middle Ages, Marbodus asserting that its wearer was exposed to the assaults of demons and of ugly visions by night, besides being plagued with quarrels and lawsuits by day. The sole remedy was to wear a Sard as well, which would completely neutralise the mischievous influence of the Onyx.

OPALUS: Οπάλλιον: *Opal.*

PLINY'S poetical description of his Opalus sufficiently proves that he is speaking of the beautiful gem still bearing that name. "Made up of the glories of the most precious gems, to describe it is a matter of inexpressible difficulty: there is in it the gentler fire of the Ruby, there is the brilliant purple of the Amethyst, there is the sea-green of the Emerald, all shining together in an incredible union. Some aim at rivalling in lustre the brightest azure (Armenio) of the painter's palette, others the flame of burning sulphur, or of a fire quickened by oil." This charming iridescence is not however inherent in the stone, but produced by the reflection and refraction of light in certain openings in the interior of its mass, which are not fissures, but arranged in regular directions. It is composed of pure Silica and water, the latter imbibed from the atmosphere. This structure renders it extremely tender; sometimes even flying into pieces on a sudden exposure to either extreme of cold or of heat. It is subject also to the loss of its colours, when the openings on which the play of colours depends become choked up with dust and grease in wear; although it is said they may be recovered by the hazardous operation of roasting the stone by a gradual heat. The Hungarian Opals exhibiting an uniform milkiness of surface, more or less iridescent, have from their greater density the advantage of resisting the effects of wear longer than any other sort; hence their superior value. But infinitely greater is the beauty of the Mexican when recent, presenting an unmixed globule of green fire like the glowworm's lamp, or a ball of phosphorus moistened with oil. Nevertheless of so porous a nature is this kind, that it becomes colourless if wetted; and changes to an opaque brown after a brief existence as a jewel, and consequently it has no value in the gem-market.

Pliny justly observes (xxxvii. 21), "the Opal differs at once very much and very little from the Beryl," referring, it would appear, to the glassy texture of its substance, yet with the grand distinction of its iridescence. It came next to the Emerald in value: and naturally so, being almost the only one of the really precious stones of which the full perfection could be developed, by the simple process of polishing known to the Romans. For this stone is only cut *en cabochon;* and owing to its extreme softness, the polishing is a matter of time and care alone. This is the sole instance where Pliny has quoted the selling price of a precious stone: the famous Opal of Nonius, then still in existence, as large as a hazel-nut (the greatest magnitude then attained by the stone), valued at 20,000*l.* of our money (vicies H. S.). Nonius was proscribed by M. Antony for the sake of this gem; but made his escape, carrying off the ring along with him, the sole relic of his fortune: putting up with exile rather than make his peace with the Triumvir by the surrender of the coveted treasure. The finest Opal of modern times was the Empress Josephine's, entitled the "Burning of Troy," from the innumerable red flames blazing upon its surface, the reverse being perfectly opaque. The present owner of this unique gem is unknown. The Turks of our day esteem the Opal as highly as the Diamond, and readily give 1000*l.* for one of the size just named.

"India," says Pliny, "is the sole mother of the Opal." This region (or perhaps Arabia) continued the only source of the supply of the best stones till a recent period. When De Boot wrote there was but one mine known in Hungary, and that nearly filled up with rubbish; and which besides, he remarks, had never furnished anything but the second quality of Opals, the first even then coming from India. Some mineralogists doubt the fact that any region of the East Indies produced the true Opal, merely because no such gem is now brought from thence; but the same argument applies here as in the case of the true Emerald, not at this time found in that country, formerly the principal source of the stone. The Hungarian mines of Czervenitza (where this gem occurs embedded in porphyry), a region inaccessible to the Romans of Pliny's age, now supply the finest

Opals, and of a size far exceeding that of Nonius. A gigantic specimen is exhibited in the Imperial Cabinet at Vienna.

"Some," says Pliny, "have given to this stone, on account of its pre-eminent loveliness, the name of the *Pœderos*, or Cupid;" for the same reason it was distinguished in the Latin and German of Mediæval times as the *Orphanus*, or *Waise*. Others made the Pæderos a distinct species, called *Sangenon* by the Indians; but produced in many and different localities, Egypt, Arabia, most abundantly in Pontus, in Galatia, Thasos, and Cyprus. Of this the best sort presented somewhat of the beauty of the Opal, though seldom free from flaws (scaber); but its colour was made up exclusively of purple and sky-blue (aëre), the emerald-green was entirely wanting. In this species, "to be overcharged with a wine-colour was preferable to the being too pale and watery"—terms, these, which show that by *Pœderos* was understood the bright Indian Amethyst, in parts almost colourless, in parts clouded with the richest purple, and often exhibiting a slight iridescence in the flaws to which its body is so subject: a material this so admired by the Romans, that, employing it always cut in a bossy cabochon, they placed but the most minute intaglio upon its centre, to detract as little as possible from the native beauty of the stone. In fact, Pliny (40), after stating that the perfection of the Amethyst consisted in a rose-colour, as it were borrowed from the Ruby, shining mildly amidst the purple, and most striking when the gem is held up against the light (*in suspectu*), adds, "that such gems some prefer to designate as the Pæderos, or the Anteros, others as the gem of Venus." Again (46), he describes the Pæderos as "the chief amongst the *colourless* stones (candidarum dux), though it was a question under what *colour* it ought to be classed: the name having been so much bandied about amongst the beauties of other species, so that the mere distinction of loveliness had become of itself a name." Meaning that this name of *Cupid* had been indiscriminately applied to the most elegant specimens of stones of many different sorts, being in fact a mere epithet of beauty, not of species. "Nevertheless, the actual kind (or the kind specially so designated) comes up to our expectations of what is due to such a name. For in a transparent Crystal are united a sky-blue, turning to a peculiar

green (viridis suo modo aër), a gleam of purple, and also a certain golden, vinous hue; always the last in sight, and always crowned by the purple. The gem appears steeped in these colours singly, and yet in all at once: no other is more limpid, or agreeable to the eye. The best kind is found in India, where it is called *Sangenon;* the next in Egypt, termed there Tenites; the third is the Arabian." A passage this, leading to the same conclusion as the one previously quoted, *viz.*, that the Pæderos properly signified the Opal, though applied to the Amethyst. The defects of the true Opal are thus enumerated: if its colour passed off into that of the flower called *heliotropium*, or into that of crystal or of hail; if it were intermixed with *salt*, or flaws, or little points that struck the eye.

No other gem was so successfully imitated by a glass paste (similitudine indiscreta): the only test for such being to hold them in the sun, when, if the false gems were poised upon the finger and thumb against his rays, the same colour showed through the mass unchanged, and was spent within itself. In the real Opal, on the contrary, the colour perpetually changed, shooting forth now beams of one, now of another colour, and diffusing their lustre over the fingers supporting it. Nothing shows the wonderful skill of the ancient glass-workers so clearly as this testimony of Pliny's to their success in counterfeiting the Opal, a gem which has hitherto baffled the skill of the Parisian paste-fabricant, to produce an imitation at all capable of deceiving the connoisseur.[1]

From its then enormous value, as well as on account of its fragile nature, the Opal must have been rarely submitted to the skill of the Roman engraver; for the earlier Greeks were totally unacquainted with the gem. Hence Professor Urlichs justly pronounces unique the Opal of the Praun Collection, engraved with the head of Sol between those of Jupiter and Luna.

[1] It is however possible that Pliny here alludes to the Griasol Calcedony, which greatly resembles a bad Hungarian Opal, exhibiting a flamy reflexion, but unmixed with green, and which the Romans doubtless considered as an Opal. This kind is indeed exactly and easily counterfeited in glass. Of such a material (or else of *schmelze*) were the glass opalescent cups (allassontes) sent by Hadrian to Servianus as specimens of the Alexandrian manufacture.

The somewhat rude style shows it to be a work of the Lower Empire, when the all-prevailing faith in astrology had sufficient influence to induce the possessor of so precious a substance to convert it into an amulet, of a virtue doubtless commensurate to its price. Another magnificent Opal, though corroded by time, is set in a cabalistic ring of the 13th century, now in the Braybrooke Collection.

A stone apparently so instinct with life, naturally supplied an abundant crop of superstitions to the vivid imaginations of the physicians in the Dark Ages. Some slight traces of these are already apparent in Orpheus (279), who declares that the Opal, displaying the complexion of a lovely boy (alluding to its epithet Pæderos), gives delight to the Immortals, and is also a protection to the sight. Marbodus, converting the word into *Ophthalmius*, improves vastly upon the simple dictum of his predecessor, adding that it also confers the gift of invisibility upon the wearer, so that the thief protected by it could carry off his plunder in open day.[2] But the climax is attained in the extravagant laudations delivered by Petrus Arlensis, a visionary of Henri IV.'s reign. "The various colours in the Opal tend greatly to the delectation of the sight; nay, more, they have the very greatest efficacy in cheering the heart and inward parts, and specially rejoice the beholder's eyes. One in particular came into my hands, in which such beauty, loveliness, and grace shone forth, that it could truly boast that it drew all gems to itself; while it surprised, astonished, and held captive, without escape or intermission, the hearts of all that beheld it. It was of the size of a hazel-nut, and grasped in the claws of a golden eagle, wrought with wonderful skill. It had such vivid and various colours, that all the beauty of the heavens might be viewed within it. Grace went out from it; majesty shot forth from its almost divine splendour. It sent forth such bright and piercing beams, that it struck terror into all beholders. In a

[2] *Opalus* was supposed to be only another form of *Ophthalmius*, "Eye-stone," whence sprung these notions of its virtue. Some conjecture the Opal to be the gem called by the rabbins the "Calf's-eye," which, however, was much more probably a three-coloured Onyx, like that known to the Greeks as the Lycophthalmus.

word, it conferred upon the wearer all the qualities granted by nature to itself; for by an invisible dart it penetrated the soul and dazzled the eyes of all who saw it, appalling all hearts however bold and courageous. In a word, it filled with trembling the bodies of the bystanders, and forced them by a fatal impulse to love, honour, and worship it. I have seen, I have felt, I call God to witness! Of a truth, such a stone is to be valued at an inestimable amount." By a strange freak of superstition the Opal has lost this, its ancient glory. Barbot says, "Certain groundless stories, founded, doubtless, upon the legend of Robert the Devil, have in our day discouraged the use of this gem as an ornament. People accuse it (and in the nineteenth century!) of bringing ill-luck upon the wearer. It were useless to point out the absurdity of this supposed malignant influence, which is manifested, as they say, by the fading of its colours: a change really due to the atmospheric and accidental causes already pointed out."

The mode of cutting this very fragile stone is first upon a leaden plate coated with *adoucis* (emery-powder already used); next on a wooden wheel with fine pumice-powder; finally on a third covered with felt moistened. The last polish is given with a cloth and tripoli.

OSTRACIAS, or OSTRACITIS: *Marcasite? Pyrites?*

Thus briefly noticed by Pliny (65):—"Like a potsherd (testacea), of a harder quality than the Ceramitis;[1] resembling the Agate, except that the Agate becomes smooth and fatty by polishing. The harder kind possesses such power that gems may be engraved with its fragments. The Ostracitis derives its name from its similarity to a shell (or oyster)." Two distinct substances are here described; the confusion arising from the circumstance that ὄστρακον means both a potsherd and an oyster-shell. Hence the *Ostracias* was some mineral capable of being used in gem-engraving, resembling burnt clay in colour, rough, and incapable of polish: the *Ostracitis* merely a fossil shell. What the Ostracias really was may be conjectured from the first notice of it (56):—"The Cadmitis is the same as what is called Ostracitis, except that the last is sometimes surrounded by azure bubbles (bullæ)." Now Cadmia is supposed to mean Zinc-ore, or Calamine-stone.[2] Hence it would appear that the Ostracias of the Greek gem-engravers was the Marcasite, or Iron Pyrites, which, fractured, much resembles Calamine-stone; when roasted, turns to a rusty red (testacea), and which has been used from time immemorial in Persia for polishing the harder gems. M. Ben Mansur states, "the Laal (Spinel) takes a polish with difficulty, and for a long time they were unable to polish it, until at last they brought it about by means of the Gold Marcasite called *Ebrendshe.*" De Laet, in 1647, states that the Spinel and Balais could only be polished by means of the Pyrites. Modern lapidaries use vitriol for the same purpose, the principle of both processes being identical, vitriol being merely the extract of the Iron Pyrites.

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[1] The Ceramitis is merely noticed as having the colour of a burnt brick.

[2] Rather "stream-tin," for it was "indispensable in the smelting of copper," as the Romans were unacquainted with *brass.* Again, the "Ostracitis" and the "Onychitis" are described as substances produced during the operation (xxxiv. 22).

It is indubitable that the Greeks derived all their processes of the glyptic art from Persia, whence by the way of the Ionian cities the use of intagli had been introduced amongst them; and whence, from Sardis in particular, the gems were exported.

But the use of Pyrites amongst the Romans in this art is not a mere matter of conjecture. Heraclius, in his unintelligible doggrel, 'De Artibus Romanorum,' written in the 7th century, actually speaks of engraving upon glass with "the hard stone known by the name of Pyrites."

Nevertheless a suspicion that actual copper-slag may be meant by *Ostracias* is favoured by a passage in the same obscure author, where he describes the polishing of Rock-Crystal by means of "fornacis fragmine, micas," ground to powder, and spread upon a leaden plate,—

> "Nam plumbo solo tribuetur cura secandi."
>
> . . . . .
>
> "Hæc etenim plumbum conjunctio reddit acutum,
> Et suum rursus habent lateris fragmenta vigorem."

Yet it seems hardly possible that any merely vitrified matter should be sufficiently hard to be thus employed as a substitute for emery, even if he means the Ostracitis of the copper-furnace.

Again, if we suppose the name Ostracitis to be derived from the resemblance to a shell, it is a singular coincidence that fossil shells, especially echini and small ammonites, are very plentiful, composed entirely of Iron Pyrites, forming beautiful golden objects which must have often excited the admiration of the ancient mineralogist.[3]

From its use to the lapidary the Marcasite was an important article to the Persians. Ben Mansur devotes a separate chapter to it, dividing the kinds, according to their colour, into gold, silver, iron, and copper, Marcasites. Marcasites, when facetted, have a true adamantine lustre (though perfectly opaque), which they preserve without tarnishing. In the last century they were much used in jewelry as a cheap substitute for Diamonds.

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[3] Which Pliny actually records of the latter fossil. "Ammon's Horn, reckoned among the most holy gems of Ethiopia, is of a *golden colour*, and presents the image of a ram's horn: it is pretended that it procures prophetic dreams" (60).

OVUM ANGUINUM: Ὀφίτης.

"MOREOVER, there is a kind of egg in mighty reputation in the Gallic provinces, of which Greek writers have no mention. Innumerable snakes, twining together in summer, make a ball, by a skilful combination, out of the froth from their jaws and the slime of their bodies. It is called the Ovum Anguinum. The Druids assert that it is tossed on high by their breath, and must be caught in a cloak before it touch the ground: the robber makes his escape on horseback, the snakes following him till they are stopped by the intervention of a running stream. The test of its reality is, that it should float against the stream, even though set in gold; and, so ingenious are magicians in disguising their impositions, they declare it must (to have any virtue) be captured at a particular age of the moon—as though it were within the will of man that such an operation should coincide with any determined time. I have myself certainly seen the egg, which is of the size of a small, round apple, covered with a cartilaginous crust, with many excrescences, like the suckers on the arms of the cuttle-fish. It was being worn at the moment as the badge of a Druid. It is marvellously extolled for its effect in giving success in battle and in petitions to princes: a proof of the falsity of which is the fact, that to my knowledge a Roman knight from Vocontii was put to death by the Emperor Claudius for no other cause than the carrying of one in his bosom during a trial. This embracing together of the serpents, and their thus productive union, seems to be the cause why foreign nations have made the Caduceus entwined with snakes, one of the emblems of peace; for it is not the custom to represent the snakes on the Caduceus as having crests" (*i. e.* not as the serpents called by the Romans "dracones," the sacred reptiles above all others, the Egyptian Aspis).

These details show how much in the wrong antiquaries are in giving the name of Ovum Anguinum, or Druid's Bead, to the large spheres of variegated glass (often exhibiting the most vivid colours, arranged in elegant wavy patterns equal to any traditionally reproduced by the Murano factories) that formed the central ornament of Roman-British or Saxon necklaces. But the object seen by Pliny was evidently some natural production, and his description applies better to a large fossil echinus than to anything else. Perhaps some lingering traces of the ancient fable may be the cause why a species of the recent shell yet bears the popular name of the Mermaid's Egg. This explanation too is corroborated by Mediæval tradition; for De Boot actually figures two fossil echini as specimens of what in his day was accounted the true Ovum Anguinum, and prized as an antidote against poison; but he sapiently adds that they do not agree with Pliny's description. The longitudinal septa of the shell were construed into as many lizards attached to its surface.

Singularly enough he notices that the travelling quacks were in the habit of selling to the simple Bohemians, as the veritable Serpent's Egg, and generated according to all the circumstances of the old Druidical legend, a thing hence called *Duchanek*, or the Breath-stone (lapis Spiritalis). This was a thick glass ring, bluish-green in colour, having but a small opening. On the exterior circumference were set equidistant projections in blue and white, like eyes. De Boot warns his readers against being taken in by these mysterious-looking objects, stating that in Belgium in his boyhood (about 1555) they were commonly used by women for an ornamental counterpoise to the ends of their spindles, for which purpose they were manufactured there. These identical articles occasionally are turned up in England, and are still received without question as indubitable Druid's Beads.

In the Middle Ages this wonderful production passed only for an antidote against poison, pestilence, bad air, &c.; but we see from Pliny's notice that anciently the virtues attributed to it were of a much higher and supernatural order, not merely medicinal. It was for the attempt to pervert justice by magical means that Claudius, "the wisest fool, or the foolishest wise man" (as was said of our James I.), amongst the emperors, put

to death the Gallic gentleman who had come armed with one into Court, his cause apparently being tried before the Emperor himself: whence the peculiar heinousness of the offence.

The extraordinary appearance of these fossils, often filled up with gold-like pyrites, and inclosed in the heart of large masses of chalk, or lying deep in the solid clay, necessarily rendered them objects of wonder, and perhaps of religious awe, to their ignorant finders, in the days when geology was an unknown science. Even common pebbles, of a more than usual perfectly spherical form, seem to have been regarded by the Celts as holy things. It is said that some have been preserved on the chapel-altars (like the *Salagrama* of the Hindoos) in remote Irish districts from time immemorial, and the water in which they are steeped considered a specific for diseases of cattle. The head of a certain Highland clan also possesses, by descent from the remotest ages, a white sphere possessing similar virtues, in all probability come down to him from the Drüidical period.

This famous Gallic talisman bears a singular analogy, both in its name and properties, to the Ophites or "Serpent-stone" of the Asiatic Greeks; for Pliny's *Ophites* (xxxvi. 11) has no connexion with our subject, being only the green serpentine marble used in his time in decorative architecture. But Orpheus (355) styles it (the gift of Apollo to Helenus) "the vocal stone, the truth-telling Sideritis, which some mortals prefer to call the Ophites, in which dwells a soul (ἔμψυχος), round, rough, black, hard. All over its circumference run sinews like unto wrinkles, deeply scored upon its surface." After keeping a fast, and perfect chastity for thrice seven days, the seer bathed the stone in running water, clothed it in soft raiment like an infant, and setting it in an illuminated shrine, inspired the mass with life by means of certain mighty spells chanted over it. Then taking it in his arms he fondled it like as a mother does her babe, whilst he questioned the spirit within, and received true responses to all his demands. By this means did he reveal to the Atridæ how his native city Troy was capable of being captured. But Orpheus warns whoever prepares to consult the oracle, to arm himself with courage, lest, when he first hears the stone, growing instinct with life, utter a cry like that of a new-born

babe desiring the breast, his hands unnerved by terror let the ball drop upon the ground, and thus excite the heavy wrath of heaven. But if he had courage enough to consult the oracle, it would return to every question the most infallible answers. At the end, the consulting party is ordered to bathe the stone a second time, and holding it to his eyes watch it closely, when he would perceive the spirit departing out of it in a wondrous manner.

This last character suggests the idea of the Hydrophane, a brown opaque kind of Opal, which, after immersion in water, becomes transparent and lustrous, returning to its primitive dull opacity as the liquid evaporates from its pores. The gem on this account was greatly admired in former times, and was honoured with the title of *Oculus Mundi.*

Another virtue of the Sideritis alleged by Orpheus (413) is that the bearer may walk securely amongst serpents, though they should meet him in swarms. If even he tread upon them with bare feet they never think of using their teeth, but either hasten away terror-struck, or else, if rushing to the attack, stop midway in their career, and, raising their necks on high, fawn upon him with their tongues like so many dogs. Guarded by this amulet, the hunter Euphorbus slept in the forests of Ida unhurt, close by the most savage dragons. The powder of it also was a sure antidote for the serpent's bite. Besides this it was a cure for blindness, deafness, barrenness, and impotence.

The Memphitic kind of the *marble* Ophites, which approached in fineness of quality to a precious stone (gemmantis naturæ), was employed by surgeons as an anæsthetic agent. Powdered and mixed with vinegar, the paste was smeared over the parts that had to be cauterised or amputated. "By this application the body loses all pain, becoming as it were benumbed" (Plin. xxxvi. 11). An attempt has lately been made to revive the use of local anæsthetics in modern surgery.

Pliny accurately distinguishes his Ophites marble from the Lacedemonian (Verde Antique), "of a most precious kind, and the most gay of all (hilarius)." A similar marble, named after Augustus and Tiberius, had been discovered in Egypt during their respective reigns. The Verde Antique has angular patches of

pure white marble dispersed throughout an unmixed green mass, much resembling Jasper in its colour and slight translucency. The Ophites (Green Serpentine), on the contrary, is dull, opaque, and merely speckled with white. Pliny makes two kinds: the pale and softer, the dark of superior hardness. He notes that it did not afford columns, except of very small dimensions. In fact existing remains show that the Romans used it chiefly in veneers for coating the walls of rooms, or for inlaying in their "pavimenta sectilia." The Romans evidently knew nothing of the quarries at Prato near Florence, that now furnish Green Serpentine, "Verde di Prato," in inexhaustible quantities, and extensively employed by the Tuscan marble-workers for vases, inkstands, and similar artistic manufactures.

PANTARBES.

Pliny has no mention of this marvellous gem, but later writers have more than made up for the omission. Apollonius Tyaneus, according to Philostratus, saw it during his visit to India, and brought back the following account (iii. 46). It was as big as the thumb-nail, of a fiery colour and luminous by night. It was generated at four cubits depth underground; but so forcible was the exhalation from it as to cause the superincumbent earth to crack and thus betray its existence. It eluded the touch of the vulgar, and could only be drawn forth by means of certain rites and charms known to the Brahmins alone. But its peculiar virtue was that of attracting all other precious stones; for if any number of the latter were dropped into a river or even into the sea, and this gem were let down attached to a string, they all clustered about it like a swarm of bees around their queen, no matter how far dispersed at first, and were drawn up adhering to it. Such a gem naturally was invested with the most wonderful virtues. By means of such an amulet Chariclea escapes unharmed from the pyre to which she had been condemned by the jealous Arsace (Æthiop. viii. 11); inasmuch as she had secreted about her the espousal-ring of king Hydaspes, "which was set with the stone called Pantarbes, engraved with certain sacred letters, embodying, as it has proved, some divine charms, by means of which a virtue is added to the gem antagonistic to Fire; and thus giving to the wearer immunity from danger in the very midst of the flames."

The fable recorded by Philostratus bears a strong resemblance to the mode of discovering the Topazion mentioned by Diodorus Siculus; and possibly refers to the same stone. The Indian name, modified by the Greek into Pantarbes (All-feared), seems to

have suggested the notion of the deference paid to it by all other gems to which it stood in the relation of a queen-bee to her swarm.

It would seem that the Ruby is the stone intended by all these legends savouring so strongly of a Persian origin. The high estimation in which it was held, its fiery colour, and luminousness in the dark, are all points supporting this explanation. This also supplies the reason why this particular gem should have been selected for an amulet against the element of Fire; for the distinctive epithet of the true Carbunculus was Acaustus, "the incombustible:" and the substitution of an active for a passive virtue was facile with the Oriental worshippers of gems. Hafiz sings how that Jamshid's Ruby Cup blushed rosy like the dawn through the porphyry walls containing it.

PORPHYRITES : *Porphyry.*

An igneous rock of dark-crimson ground thickly dotted with small crystals of felspar. Though there are other colours of precisely the same stone, as far as its chemical composition goes, yet the ancient Porphyrites, "purple stone," designated exclusively the first-named kind. It took also the epithet Leptopsephos from its speckled texture. Egypt alone produced it in Pliny's age, and in masses of sufficient dimensions for the largest works. But under the Lower Empire the Romans obtained an inexhaustible supply of the finest material from nearer home; Valery observed on the coast of Sardinia vast quarries of Porphyry with shafts of columns lying about, merely roughed out as they were left by the workmen. The earliest works in it seen at Rome were statues of Claudius brought from Egypt by his deputy Vitrasius Pollio, a novelty, which Pliny remarks, was not received with approbation, at least no one had up to that time followed his example.

Under the Lower Empire, however, it was largely employed in the most sumptuous edifices then erected, in the form of columns of *labra* for the baths, and of sarcophagi. Some of these columns, in a single piece 42 ft. long, are still to be seen fulfilling their original destination (having mostly been destroyed for the sake of the material), in the portico to Constantine's Baptistery at Rome, and in the mosque of Sta. Sophia. It was a fashionable material for the lower parts of the later imperial busts, having the head alone in white marble or bronze, its colour aptly reproducing the sovereign purple (a dark crimson dye). Those ages have left to us certain works in Porphyry, the execution of which remains a mystery: perhaps the most wonderful things the Roman sculptor ever produced, considering the elabor-

ateness and high relief of the sculptures, and the invincibility of the material employed. The magnitude of the original blocks is likewise a subject for admiration. Of these monuments the principal are the Sarcophagus of the Empress Helena, in a single block, 19½ palms high by 12 long (13 × 8 ft.) of the finest texture and deepest colour. It is adorned on the two fronts with a military procession, the "Triumph of Constantine," comprising many figures on horse and foot. Busts of Helena and Constantine stand out in the highest relief, as medallions above. Placed at first in the Mausoleum of Helena (now the Torre Pignattara), it was removed thence to the Lateran by Anastatius IV., in 1154, to serve for his own tomb; and was set close to the Porta Santa until 1600, when it fell to pieces on being removed in the course of the alterations of that Basilica. The fragments remained in the cloister until restored and placed in the Vatican Gallery by Pius VII. The restoration and repolishing of this monument occupied many hands continuously during seven years.

The second, the Sarcophagus of Constantia, daughter of Constantine, is of very inferior work to the preceding. Cut like that out of a single block, 11 palms long by 8 high (7⅓ × 5⅓ ft.), the two fronts present groups, prettily designed, of Cupids engaged in the vintage: below are peacocks and rams. On the ends stand boys holding up bunches of grapes in allusion to Christ's words, "I am the vine, ye are the branches." On account of these sculptures it was known during the Middle Ages as "La Tomba di Bacco," and remained uninjured in its original site within the sepulchral chapel of Sta. Costanza, until transferred by Pius VII. to the Vatican. A copy in plaster occupies its ancient place in the Mausoleum. Small pieces of Porphyry, selected for their peculiarly bright colour, were occasionally engraved upon by the later Romans, but merely as talismanic intagli, and similar devices making no pretensions to art.

The ingenuity of Renaissance gem-engravers, however, has availed itself of this substance: there is in the Uffizi Gallery at Florence an excellent head of Leo X., an intaglio on a large circular seal, set in iron after the manner of a coin-die, and designed to impress the leaden bulls of that pontiff.

The art by which the Romans worked these vast masses with

such evident facility is entirely lost. At present when employed in architectural decoration the only method of subduing the stone is to steep it for many weeks in urine, and even then it speedily turns the edge of the best steel tools. It has therefore been conjectured that the old sculptors worked both this and Basalt by means of emery-powder and chisels of soft metal. It is known that the early Egyptians executed their stupendous works in hard stones with bronze chisels, some of which have been found in the quarries.

The Grand Duke Cosimo I. was mightily vain of a discovery how to temper steel tools by some chemical means so as to cut Porphyry (Galluzi, iii. 127), and several statues executed by his order still adorn the entrance to the Boboli Gardens; but their execution is rough and clumsy, not approaching in the least to the beautiful polish of the ancient works in Porphyry.

PRASIUS: Πράσιος: *Plasma.*

THE ancient Prasius, so called from the resemblance of its colour to the peculiar green of the leek (*πράσον*) is now included in the numerous class of green stones styled indiscriminately Plasma by the antiquary. This word, formerly written Prasma, whence the French name, Prisme d'Émeraude (the origin of the absurd designation Root of Emerald) is merely the Italian corruption of Prasina, according to their common vulgarism of changing R into L and vice versâ. Under the Lower Empire, when the slang of the circus had become the current language, Prasinus, the colour of the Green faction, came to denote that particular shade to the exclusion of the more general word Viridis. Hence we find the panegyrist (in Symmachus) using the word Prasini instead of Smargdi; and Epiphanius (XII. Stones of the Breastplate, iii.) remarking that the Smaragdus is called also the Prasius.

The Plasma is merely translucent Calcedony coloured green by some metallic oxide, of copper when dark, of nickel when of a brighter shade. It is in fact a nearly transparent green Jasper, and though frequently approximating in colour to the finest Emerald, it is seldom quite pure, but marked with black spots, or yellow patches, betraying its proper species. There is, however, a pale-green variety, of which ring-stones are found perfectly free from all such blemishes, and remarkably transparent. Such are specimens of the true Prasius of the ancients, their tint exhibiting an exact resemblance to the colour of a leek. These greatly resemble the true Emerald in their oily, soft tint, though they have not its peculiar lustre; and these were without doubt the Smaragdi, which the *Greeks* speak of as being engraved for signets. Pliny indicates exactly the species, by noticing that

one kind was "horrent with drops of blood," our Heliotrope; and the third, marked by three opaque white lines. This last is the same stone as that described by him under "Jaspis" as universally worn for an amulet in the East; resembling the Emerald and surrounded by a white line passing through its middle, and therefore called the Grammatias; as that with more than one line was termed Polygrammos. I have met with a Gnostic amulet on a stone exactly answering to this description of the Grammatias; and by its means identified the true Prase beyond all possibility of doubt.

But amongst the numerous varieties of the Plasma some are to be occasionally seen which distinguish themselves from the rest by the purity of their substance, and peculiar shade of light green slightly tinged with yellow. They strongly resemble the Prehnite (silica, alumina, lime), a stone as hard as the Garnet, and found in considerable botryoidal masses in the Tyrol as well as at the Cape of Good Hope. As we know the Romans obtained Rock-crystal from the Alps, there is no reason why they should not have discovered and made use of the Prehnite also: its colour and hardness would have highly recommended it to a people such lovers of green-coloured gems.

The commonness of the stone when Pliny wrote, is clearly shown by his expression "vilioris est turbæ Prasius," the Prase belongs to the vulgar herd. It was extensively used for intagli by the Romans of the Lower Empire, though but little at an earlier date, to judge from the circumstance that although engravings in it are more abundant than in any other material except the Sard and Carnelian, yet any of really fine work are excessively rare; and of the Greek period, never to be met with. The subjects also engraved upon it are usually of the class most in fashion in the times of the Decline, such as Eagles, Victories, Venus, and the Graces. It is strange that it should not have been more employed by the artists of a better period, both on account of its agreeable colour, and its resemblance to Calcedony in the facility of working. One would argue from this that the material was of late importation into the Roman world. As for cameï in this stone, though abundant enough, yet they seem with few exceptions to belong to the times of the Renaissance, or later.

The native country of the Prase is now unknown, but lumps of it unworked are sometimes picked up amidst the débris of Roman edifices. Several of the green stones distinguished by Pliny with the names of Prasoides, Tanos, Molochites, and perhaps the Callaina, are, to all appearance, now included under the indiscriminate appellation of Plasma. Certain it is, that the great variety of the tints and substances of the stones so designated at present would have induced the ancients, whose mineralogical nomenclature was entirely based upon external peculiarities, to class them under different names.

Prismatical beads of Plasma, as well as of Garnet, are often found in the earth about Rome. They all range to nearly the same size, so that antiquaries have little difficulty in forming an even row out of many distinct purchases. A fact this tending to prove in its way, that our Plasma was but a species of the Green Jasper of the ancients: for Naumachius names necklaces of the Jaspis as equally coveted by women with those of the Hyacinthus (Sapphire).

Orpheus (749) sings: "Hence (by eating of the serpent-sacrifice) was I taught thy powerful virtue as a remedy against the sable asp; thou life-saving, divine stone, that bearest the name, and the colour, of the green leek." Here we find the root of the manifold virtues as an antidote ascribed to the Green Jasper by mediæval sages.

SANDASTER: *Aventurine* (?).

A GEM so called from the locality in India that produced it; sometimes also known as the Garamantica, as coming from the interior of Africa. It was likewise found in Southern Arabia. It is described by Pliny as related to the Anthracitis (a substance like fossil charcoal, and probably Jet); but its value consisted in the circumstance that a fire shone enclosed within it, with golden drops glittering like stars, and these always within the substance of the stone, not upon its exterior. (xxxvii. 28.)

Hence De Laet, and most mineralogists after him, pronounce the Sandaster to have been our Aventurine (then newly brought from India), a reddish-brown translucent quartz, filled with innumerable particles of gold-like mica. It takes its present name from the fact that the Venetian imitation of it, so often seen in brooches, &c., was found out "per aventura," by good luck; from the accidental admixture of brass filings with melted glass.

But the innumerable specks of gold, the chief beauty of the Aventurine, prove of themselves that this was not the *Sandaster:* because the latter was held a sacred gem, as bearing an affinity to the heavenly bodies, on account of the stars within it being arranged as the Hyades stand in heaven, and in the same number—that is, only *five.* Besides, the golden specks in the Aventurine would not have been described by Pliny as *stars,* implying a certain definite form, but as *aureus pulvis,* the terms he uses of the similar appearance in the Lapis-lazuli.

The brilliancy of the Indian kind was so great as to injure the sight, if viewed too long. Another character mentioned by Ismenias, that this gem could not be polished in consequence of its tenderness, and therefore brought a high price in its native condition, does not by any means suit the Aventurine, a hard

stone, and requiring a polish to bring out its beauty. All agreed that the more of such stars the gem contained, the greater became its value.

Nothing now employed in jewelry corresponds to this obscure account (Pliny himself had evidently never seen the stone) so well as the Matrix of Opal, a compact Serpentine of a dark brown colour, and filled with minute Opals of extraordinary lustre, resembling indeed to a fanciful eye, the stars that gem the brow of night. This beautiful substance cut into thin slabs, their value proportionate to the number of Opals they contained, was formerly much in fashion for the tops of snuff-boxes, and similar trinkets.

The name *Sandaster* sounds like a Persian epithet, and appears to be corrupted from Saan-Aster, the Royal Fire. Pliny notices that it was used by the Chaldeans in their religious offices, in virtue of the stars it contained. Another stone was often confounded with it from the similarity of its name, viz., the *Sandaresus*, or Sandaresion, also an Indian stone. But this was of an apple or olive green, and of no value.

The Lumacella marble has in one respect a strong claim to represent the Sandaster: its ground being jet-black, and answering so far to the comparison of the ancient mineral to the Anthracitis; but the fires blazing so wonderfully within its darkness assume the curved forms of broken shells, and could not possibly have represented *stars* to the Chaldeans, the givers of its name.

SAPPHIRUS: Σάπφειρος: *Lapis-lazuli.*

THAT the Sapphirus of the ancients was our Lapis-lazuli, is evident from the remark of Theophrastus (23). "Of stones, there are also others out of which they engrave signets, some for the sake of their beauty alone, such as the Sard, the Jasper, and the Sapphirus: this last is, as it were, spotted with gold-dust." The same appears from Pliny's more detailed description of it (xxxvii. 39), that it came from Media (whence the entire supply of Lapis-lazuli is brought to the present day, meaning Persia and Bokhara); that it was opaque and sprinkled with specks of gold; of two sorts, one of a purple-tint (cum purpura), the best, and found in Media; the others, of a dark blue colour (cyanei), were accounted the males of the species. Epiphanius is very instructive upon this head. "Fifth: the stone Sapphirus, purple in colour, like that of a dark-blue beetle. Of this there are many kinds: for there is the Royal spotted with gold, yet this is not so much esteemed as the sort altogether blue (unmixed). And this is reported to be found in India and Ethiopia, wherefore they pretend that the sacred place of Bacchus amongst the Indians has a flight of 365 steps made out of the Sapphirus:[1] though most people think this story incredible. This gem is admirable and very beautiful, and agreeable to the eye, wherefore they set it in bracelets and necklaces, especially for the wear of princes. It is likewise medicinal, for being powdered it heals the sores following pustules and boils if smeared over

[1] Dion. Periegetes describes the sandy deserts around Mount Parapamisus, the territory of the Ariani, as abounding with quarries of the Sapphirus and *Coral*. This last is a manifest absurdity unless he means the Corallis, or the true antique Red Jasper.

them, being applied mixed with milk to the ulcerations. It is written also in the Law that the vision seen by Moses in the Mount, and the Law given unto him, was made out of the stone Sapphirus."

Before the true precious stones were introduced from India, the Lapis-lazuli held the highest place in the estimation of the primitive nations of Asia and Greece (as we see from the terms in which Theophrastus describes it); in fact, it was almost the only stone known to them having beauty of colour to recommend it.

This was the only stone of any intrinsic value known to the Egyptians under the Pharaohs, hence it abundantly occurs in their jewelry that has come down to us, worked up into signet-stones, pendants, and charms. But this Egyptian sort appears to be of a very inferior vein, dull and pale in colour. Still rarer was the material amongst the contemporary Assyrians to judge from the scarcity of cylinders in Lapis-lazuli, though a few such do exist; whence it may be concluded that the Egyptians had worked mines of it in their own territories (the Ethiopian above quoted) from the earliest times.

Although Pliny says it was in his times considered as unfit for engraving upon in consequence of its substance being full of crystalline points (the spots of pyrites that appear like gold), yet we have works in it of every period of antiquity. True it is that for such have been selected portions of the pure unmixed blue, mentioned by Epiphanius as the sort most admired. These, too, have in many cases preserved their colour and original polish to an astonishing degree, proving the vastly superior hardness of this species over that known to the Egyptians. Greek intagli in this stone are extremely uncommon, yet a large scarabeoid recently brought from Athens (now in the Rhodes Collection), is engraved with a kneeling Venus robing herself, in the purest style of the age of Phidias. The Praun gems boasted a noble head of Alexander, on a large circular disk of the deepest violet, the reverse also engraved with full-length figures of Apollo and Venus: the work of which is pronounced by Steinbüchel to be contemporary with that monarch. Both intagli and cameï of the Roman times are frequent in this material, in spite

of Pliny's assertion; though such are rarely works of great merit, yet fairly executed Roman intagli in Lapis-lazuli are often to be seen. The Marlborough Cabinet possesses a few; more remarkable, however, for the extraordinary beauty and depth of colour of the material, than for the engravings of this date upon them. The Persians under the Sassanian dynasty often employed it for the seals bearing regal portraits.

With the Italians of the Cinque-cento it was an especial favourite, particularly for vases (of which the Louvre Museum displays a matchless example), and for miniature busts, and small relievi.

A serious defect of this substance is that by exposure to heat and moisture it loses its beautiful azure, and assumes sometimes a black, sometimes a chalky appearance; yet the best quality used by the Romans has often retained both colour and polish unimpaired in wonderful perfection.

The Egyptians covered much of their small works in terra-cotta, idols, symbolical figures, rings, &c., with a coarse thick blue enamel, to give them the appearance of being carved out of this valuable mineral. But the Romans, who carried the manufacture of pastes to such perfection as regards colour and hardness, were eminently successful in their production of an artificial Lapis-lazuli, hardly to be distinguished when polished from the genuine stone. The most wonderful example of the art ever produced is the Townley *Bonus Eventus* (British Museum), where the youthful deity is represented a three-quarter length and in half relief, in the most finished style of Roman art, upon a slab of this composition about eight inches square. The relief has been carefully worked over after leaving the matrix in the same manner as a cameo in hard stone; and nothing can be more perfect than the imitation of the azure and texture of the actual Lapis-lazuli. The figure is evidently the portrait of some youthful Cæsar, represented according to custom under the character of this deity of promise; the features harsh and surly in their expression, though somewhat softened down by the artist, are indubitably those of the young Caracalla, thus inappropriately personified.

SARDIUS: Σάρδιον: Σάρδιος: *Oriental Carnelian.*

THE Sard, according to Pliny, is so called after the place Sardis, where it was first discovered. This etymology, however, is merely based upon the similarity of the words, and is of no more worth than the ludicrous derivation given by Epiphanius, from its resemblance in colour to a pickled sardine—an idea that very naturally suggested itself to an icthyophagous Byzantine saint. But Σάρδιον, the earliest Greek form of the word, cannot be derived grammatically from Σάρδεις; its root is undoubtedly the Persian *Sered*, "yellowish red," very slightly altered. The name came with the stone from Persia; the Babylonian mine produced the sort first known and most esteemed: hence the stone is termed by Epiphanius the Babylonian Sard.

Of the modern name Carnelian, the derivations are numerous, the usual one being from its colour of raw flesh (carneus). Again, it is spelt Cornelian, as if from Corneolus, and equivalent to the German *Hornstein*, which signifies the European sort. Lessing, with some plausibility, supposes this form taken from the French *Cornaline*, to describe its similarity in colour to the cornel cherry.[1]

The common Carnelian, a semi-transparent quartz coloured red or yellow by oxide of iron, and its superior Oriental variety the Sard, hold the first place in the list of stones employed by the ancient engravers, presenting us alone with as many intagli cut upon them as all the other species of gems collectively.

The Carnelian is found abundantly in many parts of Europe, wherever the shingle on the coast is composed of flint-pebbles,

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[1] The word *Carnelius* dates from the Decline, for we find Marbodus using it (xxii.) to denote a different and inferior stone to the Sardius. As he alludes to its colour of raw flesh, he evidently held to the first derivation of the name.

or in the beds of mountain-torrents of similar formation; and scattered together with Agates over the Egyptian Desert. It is of the same nature as the latter stone, only differing in the arrangement of its colours; and seems to be what Pliny distinguishes from the rest of the species by the name of Sard-achates, just as his Leuc-achates is the Calcedony, or White Carnelian.

In this dull red, cloudy, and softer stone, are the most ancient intagli usually cut, the Egyptian and Etruscan scarabei, and the greater part of the gems engraved in Etruria. The beds of the Tuscan rivers furnished a plentiful supply of this material; even at the present day the shingle of the brook Mugnone, near Florence, yields Carnelians in great abundance. But the beautiful transparent species, the true Sard, came from India alone. Already (B.C. 400) Ctesias, in his 'Indiça,' mentions the "great mountains out of which are dug the Sardò, the Onyx, and other gems," lying fifteen days' journey from the sandy desert (between Cutch and Moultan); and again, the "mount Sardò, and the mountains where the gem Sardò is dug" (Ind. § 5). And Plato (Phædo. p. 110) describes the "True World" (Paradise) as a region where all the rocks are that substance of which the stones so coveted by the Greeks—Sards, Jaspers, and Emeralds—were but fragments that had escaped the universal ruin of all things here below. But when the trade with the East was opened fully out by the conquests of Alexander, and the establishment of a powerful Greek kingdom in the North of India, the Sard came into general use. "No other stone," observes Pliny (xxxvii. 31), "was so great a favourite with the Greeks as this: at least the plays of Menander and of Philemon revel in allusions to it." On this stone all the famous works of the most celebrated artists are to be found, for as a general rule fine work was never thrown away upon an inferior material; and there was good cause for this preference, such is its toughness, facility in working, beauty of colour, and high polish of which it is susceptible; which last, Pliny remarks, it retains longer than any other gem. The truth of this assertion has been confirmed by the eighteen centuries that have elapsed since he wrote, for antique Sards are found always retaining their original polish, unless where very roughly used; whilst harder gems—Garnets, Jacinths, and Nicoli—have

their surfaces greatly scratched and roughened by wear. So true is this, that the existence of a perfect polish upon any of the latter class of stones affords in itself a tolerably sure proof that it is either modern or has been retouched in modern times.

The gradations of colour exhibited by the antique Sard are almost innumerable. The bright cherry deepens into the fiery red of the Carbuncle, and thence into a semi-opaque black, only red when viewed by transmitted light. The bright pale yellow increases in intensity to the richest orange, and thence to a reddish-brown scarcely to be distinguished from the Jacinth. This again increases till it darkens to the deepest coffee-colour, and complete opacity. In a rare variety a slight admixture of green produces an olive tint, but yet easily distinguishable from the Plasma. In all these, again, the variations of the intermediate shades are infinite.

When Pliny wrote, the bright-red variety was the most esteemed; the honey-coloured (*i. e.* the yellow and semi-opaque) were of less value; but those of the colour of a burnt brick (testaceæ), or red and opaque, the common Carnelian, were utterly rejected. The bright-red are certainly very fine in tint; they are extremely transparent, and often come near to the Carbuncle in colour and in lustre, but may always be recognised by the tinge of yellow invariably mingled with the crimson. Those in which this colour deepens into the dark tint of the Morella cherry were considered the males of the species; for the Romans, following the Greek mineralogists, divided gems into males and females, according to the depth or lightness of their shades.[2] In this bright-red sort are the finest Roman intagli for the most part found. The light-yellow sort, resembling amber, was much employed at an earlier period. On *this* most frequently occur the finest works of the Greek artists, more especially those stiffly-drawn but highly-finished figures of the most minute execution, surrounded with borders, which were formerly termed Etruscan, but now with more reason ascribed to the Archaic Greek school. Some good Roman works occur in this variety, but they are few in number and of an early date, their scarcity confirming Pliny's

[2] Theophrastus (30).

statement as to the disrepute into which the yellow-coloured had fallen.

Bright-red, indeed, was the primary distinction of the Roman Sard, and hence the origin of Epiphanius' ridiculous etymology; and thus Marbodus characterizes it "Sardius est puniceus, cujus color sanguineus." But *now*, by a singular perversion of meaning, the French restrict the name *Sardoine* to the yellow and brown sorts, calling the red alone *Cornaline*. The former word being naturally enough translated, by English and German writers, as *Sardonyx*, has given rise to much confusion in quoting from Catalogues drawn up in French. Similarly, the absurd practice of the English lapidaries of the last century, in calling *Beryls* the same sorts of Sards, has proved to the French and German archæologists (like Clarac and Dr. Brunn) a fruitful source of error in their descriptions of engraved gems.

The supply of Sards from Babylon had failed before Pliny's age. They were said to have been found in the vicinity of that city, enclosed, like a heart, within other stones on their being broken open, and therefore termed "lapicidinæ;" but afterwards they were discovered in many places, as in Paros and Assos. Those from Leucas in Epirus, and the Egyptian kind, were set with a gold-foil under them; whence it may be concluded they were transparent. The Arabian were more opaque; the Indian transparent. Of the latter there were three kinds: the red; the second either of a large size or of a fatty nature, for the passage is disputed—Jan reads, "quas *Pionias* vocant a pinguetudine;" the third was set with a silver foil, hence must have been of a dark-red, the same foil being now in use for Carbuncles. Sards retained their lustre longer than any other gem, but suffered most from contact with oil. Veltheim has carefully investigated the subject of the ancient trade in this and similar stones, in his treatise, 'Ueber die Onyxgebirge des Ctesias.' At that time (1797) these Sards were occasionally brought to Amsterdam and Copenhagen from Cambaya, as ballast in large casks. They had been sold at Brunswick by Voigt of Amsterdam at the rate of 38 florins per cwt. Specimens from these, in the cabinet of Dr. Bruckmann, were the true Sarda Nobilis; and some also exhibited fine Onyx layers. He further men-

tions that a quarry of Sards and Calcedonies was then worked near Guzerat.

Mohammed Ben Mansur divides the Carnelian into seven kinds, viz.: the liver-coloured, rose-red, yellow, white, black, blue, bicoloured: (evidently including certain single-coloured Agates under this denomination). He adds, "Although a hard stone, it is commonly used for the engraving of signets upon." It was then found at Senaa and Aden in Yemen; on the confines of India and Rum (*i. e.* the Byzantine Empire), and in the vicinity of Basra.

Amongst the other recipes for falsifying gems, alluded to by Pliny, one was "how the Sardonyx may be made out of a Sard." He evidently means the artifice by which the former gem (and literally Pliny's own definition of it, "a white layer upon Sard," candor in Sarda) was imitated by placing a Sard, first coated with carbonate of soda, upon a red-hot iron. This process converted the surface into an opaque white layer of the depth required, which forms a good relief to the intaglio cut through it into the transparent ground beneath. Doubtless this effect of fire upon the Sard was discovered by accident; and the method did not come into general use till a late period of the Empire, inasmuch as fine engravings upon this substance are not to be met with, though mediocre works in it abound. As might be expected, it was a favourite material with the Italian artists of the Renaissance, to whom it was recommended by the lively contrast of colours it afforded when engraved. By first producing a white stratum of extreme thinness, and working the design out of this as it were in the lowest relief, their work had the effect of a picture in opaque white upon a ruby ground, strikingly effective. The finest example of this ingenious method known to me is a Sard medallion (Marlborough), representing Christ's entry into Jerusalem. Carnelians of this date also are to be seen with mottoes and devices written upon their surface in opaque white characters very neatly done. The recipe for this, given by Barbot, is first to obtain the white ground by the above-named process; then stopping out the parts not required opaque with a cement containing oxide of iron, the stone on a second application of heat recovers its lost colour in those parts, whilst

the letters continue opaque and white as before. The Sard has a great affinity for iron-oxide, from which its native colour is derived. It has been observed that such as have lain for centuries in their oxidised iron settings have imbibed a singular depth of tint from the contact.

Epiphanius records the prevailing belief that the Sard was of virtue for the cure of tumours, and of all wounds made by iron. Marbodus, in the 11th century (translating Evax), declares that the Carnelian drives away evil spirits, and preserves concord; whilst that of the colour of raw flesh will stanch hæmorrhages, whether natural or from wounds. As usual, this list of virtues was marvellously swelled in the progress of the Middle Ages, so that we find Albertus Magnus affirming that the Sard exhilarated the soul, drove away fear, baffled witchcraft, and was an antidote to all poisons arising from the corruption of the blood; besides its ancient property as a styptic. Cardan asserts it gives success in lawsuits, and makes the wearer rich. The philosophic De Laet, in 1647, though ridiculing all these fables, declares from his own experience its power to stop the bleeding from the nose; and that rings were cut entirely out of it to be worn for that object. Such are still made and worn in Italy, and with the same idea.

SARDONYX: Σαρδόνυξ: ὄνυξ Σαρδῶος.

This name is of later date than Theophrastus, by whom it was included (if indeed then known) amongst the varieties of the *ὀνόχιον*. It is defined by Pliny as originally signifying a white mark in a Sard, (candor in Sarda) like the human nail placed upon flesh, and both of them *transparent*. Such were the true Indian sort, according to Ismenias, Demostratus, Zenothemis, and Sotacus. The two last writers call the *opaque* stones of this class "The Blind" Sardonyx; to such in Pliny's age was the name *exclusively confined* (quæ nunc abstulere nomen). The Arabian kind exhibited no traces of the Sard (*i. e.* of a *transparent* red layer), and admitted of a variety of colours; the base (radice), black or verging on blue; the surface (ungue), like vermilion, encircled by (redimitum) an opaque, fatty, white layer (intermediate), and passing into the white with a slight tinge of purple (or blue). And more tersely Solinus: "In the Arabian Sardonyx the surface is admired if of a purer red; but found fault with, if of a dirty tint: the middle is girt by an opaque white line. The best is where neither layer diffuses its colour upon its neighbour, nor borrows anything from the other; the last (the base) finishes off with black. For any part to be transparent is reckoned a defect; complete opacity increases its beauty" (55).

Three colours were now considered essential to the idea of a Sardonyx, hence termed by Lucian *ψῆφος τῶν τριχρώμων ἐρυθρὰ ἐπιπολῆς*, as appears also from what Pliny says as to the manner of forging them (xxxvii. 75): "Sardonyx gems are made up out of three stones cemented together so neatly that the fraud cannot be discovered, by selecting one a black, another a white, the third a red, each one the best of its respective kind.

Thus Martial makes his lady-killer boast of a *real* Sardonyx thrice girt with zones (Sardonycha veram lineis que ter cinctam), a gift from some fair one. And to conclude, the Roman notion of what a perfect Sardonyx should be is prettily enunciated by Achilles Tatius, in his description of Calligone's necklace (ii. 1): "In its centre, between an Amethyst and a Hyacinth, was a triple gem, the layers of which alternated in colour, and all formed one whole. The base of the gem was black; the middle substance, white, appeared next to the black; the last, crowning the white, showed red as fire. The gem encircled within a wreath of gold, gleamed forth like a golden eye."

Though three layers at least were required to constitute a true Sardonyx, yet these might be repeated indefinitely without altering its designation. Köhler justly lays down "that it was a Sardonyx, as long as the different colours lay in regular layers one over the other. It was a Sardonyx, whether the white stratum was united with a male or female (dark or light) Sard; whether the stone possessed three, four, five, or more strata. For the name Sardonyx implied the regular union of the Sard with a white layer: now the Sard exhibited innumerable gradations, into red, yellow, brown, and black." Thus we can understand Pliny's observation that the base (substratum) of the Indian kind was found of a wax, or a horn colour; and the middle zones (circuli), sometimes colourless and transparent (abbi), with a certain faint iridescence; whilst the surface was "redder than a lobster's shell." Those from Armenia,[1] fine in other respects, had the middle zone too pale. The merit of the Arabian lay in a brilliant whiteness of this zone, which was of considerable width (non gracili), and which beamed forth (ridente) not upon the slope or low down on the gem, but upon the very projection (umbonibus); the base also being of the deepest black. Köhler, misled by the expression *umbonibus*, which he takes for the surface of the gem (which Pliny always terms *unguis*, or *superficies*), interprets this of our Nicoli, to which it does not by any means apply. Besides the fact that Pliny is

[1] Whence probably the early Persians got the material in which some cylinders (though of extreme rarity) are to be found.

speaking here of a stone necessarily having *three* layers, the *thickness* of the white zone is a sufficient refutation to Köhler's hypothesis, the top layer in the Nicolo being of infinitesimal tenuity.

Zenothemis recorded that this stone was held in no estimation by the Indians, who, instead of using it in jewelry, made sword handles out of it, so large were the pieces. These, it was well known, were picked up in the beds of torrents. They first came into request in Europe, when it was observed that they were almost the only class of gems which when engraved did not pull away the (soft) sealing-wax.[2] The natives at last had learnt from the Romans to admire these stones: "they, that is to say the lower classes, wear them bored and strung for necklaces, but make no other use of them. This perforation is now considered the test of the Indian kind."

This last remark explains the reason for the fine hole so often to be discovered passing through the axis of Sardonyx camei. The stones imported in the shape of oval beads were subsequently cut down into flattened disks, so as to present their layers properly disposed for the working out of the artist's design. From ignorance of the original destination of the material, many antiquaries have been puzzled to explain the object of these minute perforations; and still more the method by which they had been drilled through such thin slabs without splitting them. The abundance of the stone in India appears from the exaggerated tale in Philostratus (Ap. Tyan. iii. 27): "The stones that come from India, amongst the Greeks indeed are set in rings and necklaces, but amongst the Indians are of sufficient size to make flaggons and wine-coolers, and bowls holding enough to quench the thirst of four droughty men upon a summer's day."

As the principal merit of the substance lay in the evenness and contrast of the colours, the Romans rarely engraved *intagli* upon it. They employed it in their jewelry and rings cut either *en cabochon*, or in a truncated cone of an oval section, more or

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[2] Here we have the reason for the finest early engravings, whether called Etruscan or Greek, being so often found upon the Sardonyx, cut transversely: now improperly designated a Banded Agate.

less high so as to display the three zones to the greatest perfection; making them all, by cutting down the surface and the base to the due thickness, as nearly equal as possible. It was, says Pliny, a great defect if the white zone spread unevenly, and did not keep itself together in a perfect band. When intagli are found on a Sardonyx, they are always sunk but slightly, or rather sketched upon the surface, so as to be invisible at a trifling distance.

It was for camei that this material was reserved; the various shades, taken advantage of with singular dexterity by the artist, enabled him to add the charm of colour to the relief. This may be considered a symptom of declining taste, certain it is that such works all belong to Imperial times. The most remarkable example of this skilful adaptation of the design to the material is a quadriga in the French Collection, where each of the four horses is worked out in a perfectly distinct colour. The Marlborough Antonia too, admirable as a work of art, exhibits a most judicious employment of two shades, black and brown, and of a milky white, in the hair, background, and the flesh.

The largest slab of Sardonyx known is that of the Carpegna Cameo (in the Vatican), 16 inches long by 12 deep. The subject, the "Triumph of Bacchus and Ceres," in a car drawn by Centaurs, is executed with great spirit in a stone of five layers; the respective parts of the design being kept in very flat relief, for the sake of contrast, owing to the thinness of these layers.

Next in size, 13 × 11 inches, but far above it in fame, comes "Le Grand Camée de France," representing the triumph of Germanicus, where the hero is received by Tiberius and Livia, and the Apotheosis of Augustus occupies the upper portion of the composition. This was brought from Constantinople by Baldwin II., the last Frankish emperor, and pawned to St. Louis, together with other relics (of vast sanctity but no intrinsic value), for an enormous sum:[3] being then interpreted as "the Triumph of Joseph in Egypt." This stone also has five strata.

[3] 10,000 marks of silver, about 20,000*l.*, equivalent to fifteen times that sum at present.

Third in size, but superior as a work of art, in consequence of the priority of its date, is the "Gemma Augustea" of Vienna, the subject of which is the reception of Drusus (father of Germanicus) after his victory over the Rhæti and Vindelici, B.C. 17. Augustus as Jove, Livia as Roma, seated on thrones, welcome the hero and his brother Tiberius. This is the finest work in relief extant; the stone, however, has but two layers, and is rather to be termed an Agathe-onyx. Its shape is elliptical, 9 × 8 inches. This relic, wrested by Philippe le Bel from the Templars, and presented by him to the Abbaye of Poissy, was stolen thence in the civil wars of the 16th century, and ultimately purchased by Rudolf II. for 1200 ducats (6000*l.*), and that more for its value as a stone than as a work of art.

The Marlborough Cabinet boasts of another approaching to this in dimensions, being 8 inches wide by 6 deep, and the most remarkable of all in a mineralogical point of view: for it presents strata of transparent sard, *purple* or rather lilac, opaque white, and a ground of opaque black; colours not united in any other example known to the world. It bears in flat relief two well-executed imperial busts, in a style marking the commencement of the Decline, attributed without much reason to Didius Julianus and Manlia Scantilla (but more probably Commodus and Crispina): the one in the combined characters of Jupiter, Dodonæus, and Ammon; the other, of Libera, or Cores. Another large oval Sardonyx in the same collection, with the helmeted head of Constantine, is of remarkable beauty; though inferior in size to the bust of Constantinus II., the glory of the Royal Dactyliotheca, an oval of 7½ × 5¼ inches, surrounded by an architectural border: in this stone the respective layers are of considerable thickness; in the former, they are extremely thin.

The long and luxurious reign of Constantine has left us several works, some of Christian subjects on pieces of Sardonyx of the finest quality; and such appear in the latest ages of the Byzantine Empire, disfigured by designs in the wretched taste of that period, which, from their subjects, the Angelical Salutation, the Annunciation, figures of saints, &c., were evidently intended to ornament ecclesiastical plate.

The existence of this material at Constantinople at so late a

period shows what is also manifest from other sources, that a direct trade with India was maintained by the Greeks down to the times of the final extinction of their empire. Amongst the most costly presents in the estimation of the age (including a case of "named" relics of saints), sent by Alexius Comnenus to the Emperor Henry III., a vase of Sardonyx, and another of Crystal, held a conspicuous place.

The exact locality that supplied the Romans is indicated by Ptolemy, thus: "The remarkable mountains in the known parts of India are the Apocopi Hills, called also the *Pains of the Gods*, and the Mount Sardonyx, in which the stone of the same name is found; its meridian being 117° 30′ 21″. Between Mount Sardonyx and Bittigus is held by the Tabassi, a great nation." Veltheim thinks this to be the range running between Ozene (Ougein) and Tagara (Dowlatabad).[4]

The Arabian kind may have been brought from the interior of Africa by the caravans—a traffic established from time immemorial—into Abyssinia, and the other regions upon the Red Sea. The Ethiopian traders made Meroe their dépôt, where, says Diod. Siculus (i. 33), "all sorts of precious stones were to be got;" certainly not *found* in that neighbourhood but brought by the traders. Böttiger relates that Sparrmann on his return from his African exploration gave two pieces of the true antique Sardonyx, knocked off a rock that had served him for a dinner-table in the desert behind the Cape of Good Hope, to the mineralogist Danz, who afterwards got 10 carolines for each at Vienna.

Veltheim, quoted by Böttiger, explained the existence of the material in pieces of such marvellous dimensions, by supposing them formed out of slabs of Obsidean, hardened by a boiling in sulphur, and then polished and cemented together: not explaining, however, how the white and the red layers were produced. A sufficient answer to this hypothesis, is the circumstance that the strata in our camei often *undulate*, besides being of

[4] Besides paying in gold and silver, of which this trade enormously drained the empire, the Roman merchants bartered amber, coral, copper, and lead, for these Indian commodities. "India neque æs neque plumbum habet gemmis que ac margaritis suis hæc permutat." Plin. xxxiv. 38.

variable thickness; proof demonstrative that they were arranged by the hand of Nature as we now behold them.

The Romans, however, like their descendants of our day, imitated the Sardonyx by the fusing together three pieces of coloured opaque glass, so as to represent the natural stone, with surprising accuracy.[5] These, when worked over and polished like a gem, can only be detected by the test of the file. The Portland Vase, and the yet more elegant Amphora of the same description, entirely covered with vine foliage (Naples), were imitations of Onyx vases, and manufactured in this manner: the designs being cut out in the white crust fused upon the coloured body of the vase. Such imitations are aptly termed by Martial "pocula diatreta," that is, ornamented by the drill. It is curious however to notice that the same idea as to the artificial origin of the Sardonyx appears to have prevailed in the days of Theophrastus; at least this seems the natural interpretation of the passage (61): "Earthy minerals: these assume all kinds of colours by reason of the diversity of the subject-matter, and of the influences acting upon it; of which, some they soften by fire, some they fuse and pound, and so put together those stones that are brought from Asia."[6] Now it must be remembered that both the Murrhina (porcelain Jasper) and the *gemma*, of which the huge draughtboard (carried in Pompey's triumph) was made, were unknown in Rome before the conquest of Asia, nearly three centuries after the times of Theophrastus: well therefore

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[5] The antique paste imitating the Sardonyx is often extremely difficult to detect, especially when the surface has been worked over again by the artist. Some extraordinary camei in this material have come under my notice, in which the file alone could decide the question of the forgery. Martial perpetually alludes to the difficulty of finding the *real* gem in the Roman jeweller's shops. Thus his connoisseur hunts about the Septa or grand bazaar in vain (ix. 59):—

"Sardonychas veros mensa quæsivit in omni
Et pretium magnis fecit laspidibus."

Such was likewise the most acceptable reward (coupled with something else) that could be offered to a barrister who had gained a suit (x. 87)—

"Infamata virum puella vicit?
Veros Sardonychas, sed *ipsa* tradat—
Mirator veterum senex avorum
Ducet Phidiaci toreuma cœli.—

[6] Glass seems first to have been designated by the Greeks as "Molten Stone." Thus the pendants put in the ears of the sacred crocodiles are χυτὰ λιθινά (Her. ii. 69); and Mnesiptolemus bombastically describes king Seleucus as drinking σκύφῳ χυτῆς λίθου (Ath. x. 432.)

might such substances have been a mystery to the Greeks in the reign of Alexander. The use of the Sardonyx was first made fashionable at Rome by Scipio Africanus the Elder; the favourite gems of the Emperor Claudius were the Sardonyx and the Emerald. Such a predilection may well account for the existence of so many cameo portraits of this prince and the members of his family in the former material.

A perfect Oriental Sardonyx is still required to exhibit the same characters as when Pliny defined them. The base must be black (in reality a translucent chocolate colour when held against the sun) the middle zone opaque fatty white, the surface a light brown or red. It is, perhaps, now more valuable when of a certain size (the source being lost) than in Roman times; one as large as a crown piece selling for 30*l.* on the Continent. The famous collection of Baron Roger has two specimens of unparalleled magnitude and beauty, being circular disks three inches in diameter, the strata perfectly even, valued at 1000*l.* each. But that even under the Empire it was a stone of price, appears from the provision in Ulpian (De Bon. Damnat.), from a law of Hadrian's, which excepts the contingency of the criminal's having on his finger a *Sardonyx* or other precious stone exceeding the value of 5 aurei (5*l.*). The finest specimen, however, of the kind is the "great Sardonyx" of the Green Vaults, Dresden, a vast disk (not engraved) mounted as a pendant, with two smaller but still magnificent fellows of the same quality hanging from it.

In the Temple of Concord there was shown the supposed ("si credimus") gem of the celebrated ring of Polycrates: a Sardonyx, not engraved (intacta, illibata), set in a golden cornucopia (held by the goddess), the gift of Augustus, where it occupied almost the last place amongst a crowd of other gems, all deemed of superior value. It is difficult to explain how this legend came to be affixed to this particular Sardonyx: for Herodotus expressly calls the signet in question "an Emerald the work of Theodorus the Samian;" Clemens Alexandrinus adding that the device upon it was a lyre. And Pausanias has (viii. 4): "A work of Theodorus was also that signet upon an Emerald which the tyrant Polycrates chiefly wore, and upon which he prided

himself excessively." All testimonies showing that the Emerald, priceless both from its intrinsic worth, and the engraving upon it by so famous an artist, was the object the sacrifice of which to Nemesis was deemed sufficient to atone for all the other over-great favours of Fortune, and to avert her jealousy.

The Sardonyx is said by Marbodus to typify three of the Cardinal Virtues: the black, Humility; the white, Chastity; and the red, Modesty or Martyrdom. Strange to say, however, it possessed no medicinal or mystic qualities.

(Köhler: Untersuchung über den Sard, den Onyx, und den Sardonyx. Brückmann's reply to him in his Nachtrag über den Sarder, &c. Böttiger: Ueber die Echtheit und das Vaterland der Antiken Onyxcameen von ausserordentlicher Grösse. (A most copious and instructive dissertation.) Veltheim: Etwas über die Onyxgebirge des Ctesias.)

SMARAGDUS: Σμάραγδος: *Emerald.*

It has been frequently asserted by writers on Gems, as Dutens (p. 36), K. O. Müller (Archæol. § 313, 2), that the ancients were not acquainted with the true Emerald (Glucina, Alumina, Silica), which they pretend was unknown in Europe before the discovery of Peru, from whence in the present day the market is exclusively supplied. In spite of the vast quantity of Emeralds occurring in Indian jewelry, both in their native form and rudely cut into pear-drops and "tables," Tavernier declares his firm conviction that this gem was never produced in the East, neither on the mainland, nor in the islands; and that having made the strictest inquiries in all his journeys, no one was able to point out to him any place in Asia where they are found, and hence arrives at the conclusion that all Emeralds brought from the East Indies must have been imported thither from Peru by the way of the Philippine Isles. In support of this opinion Dutens asserts that in all the old Treasuries, like that of Loretto, St. Denys, &c., every kind of precious stone is to be found except the Emerald amongst the presents made to these ancient repositories by princes and other pious persons, previous to the discovery of the New World: a conclusive argument (if well-founded) that the Emerald was not known to them before. And to give greater weight to this opinion, he says it was supported by the authority of the famous mineralogist, M. d'Augny.[1]

But the careful consideration of the facts about to be stated will inevitably lead us to a very different conclusion, for they demonstrate that the Romans at least were plentifully supplied with the true Emerald, and even possessed the *Green Ruby*, Pliny's Smaragdus Scythicus, a much harder, and much rarer

[1] Dutens tries to show that the Smaragdus was our Peridot.

stone. In fact the same mountains that supplied them with the Indian Beryls (Canjarjum, in Coimbatone) yielded at the same time an equal abundance of the cognate species the deeper-tinted Emerald.

In spite of Dutens' pretended discovery, we actually *do* find numbers of these stones, often of great size and beauty, adorning mediæval pieces of goldsmith's work (to say nothing of antique jewelry), made centuries before the discovery of America—a fact in itself sufficient to prove the previous existence of the gem in Europe, from whatever other region it might have been derived. Large Emeralds, besides Rubies and Sapphires, adorn the Iron Crown of Lombardy, presented to the Cathedral of Monza by Queen Theodelinda (M. 589), at the end of the sixth century, and which has never been tampered with subsequently.[2] They also appeared in the crown of her husband King Agilulph, also of the same date, though, that had been remodelled into its last and more tasteful shape by the famous Milanese goldsmith Anguillotto Braccioforté in the 14th century,[3] but yet long before the discovery of the Peruvian mines. They may still be inspected as set amongst almost every other precious stone in the crown of the queen of the Spanish Goth Receswinthus, lately found near Toledo (now in the Hôtel de Cluny), a work of the following century (625) to the Lombard jewels just described. They appear in the Cross of the German Emperor Lotharius, made in 823 (Sacristy at Aix-la-Chapelle), and in the Crown of Hungary, made at Constantinople in 1072 by the order of Michael Ducas. And to conclude, a fine stone was to be seen in the tiara of Julius II., who died in 1513, thirty-two years before the conquest of Peru. This stone, engraved with the Pope's name, was long preserved amongst the jewels of the Louvre, but (according to Barbot) was presented by Napoleon to Pius VII.[4] And De Boot in 1609

[2] This famous Crown is a plain circlet of gold, lined with an iron "Nail of the True Cross," beaten out thin: carried off from Monza by the double-headed Vampire to her impregnable nest at Verona, but soon to be restored, let us hope, to its original depository.

[3] Employed by the Chapter at Monza to repair their plate and jewels, much damaged in their transport from Avignon, where they had been deposited.

[4] Its shape was hemispherical, and magnitude considerable, being .055mm. (about 2 inches) in diameter. The pope's name was cut on the middle.

remarks incidentally that "within these fifty years, since the Peruvian[5] have been imported, the Oriental have greatly fallen in value: from half that of the Diamond to the quarter of the price." Cellini also, speaking of the antique gems he used to buy of the country-folks during his residence in Rome (from 1524 to 1527), in which line he boasts of having carried on a very lucrative commerce with the Cardinals and other wealthy patrons of art, mentions the having thus obtained an Emerald as large as a bean, exquisitely engraved with a dolphin's head.[6] This stone was of such fine quality that, when re-cut, "it was sold again for as many hundreds of scudi as it had cost me tens." It must be noticed that Cellini was by profession a connoisseur in precious stones, and, above all, that a performance so excellent as he describes it, must have been antique, the art of gem-engraving having only been revived in Italy a few years before his own birth in 1500. And to wind up this list with a moral proof derived from Pliny's description of his best Smaragdus: "After the Diamond and the Pearl, the first place is given to the Smaragdus for many reasons. No other colour is so pleasing to the sight: for grass and green foliage we view indeed with pleasure, but Emeralds with so much the greater delight, inasmuch as nothing in creation compared with them equals the intensity of their green. Besides they are the only gems that fill the eye with their view, yet do not fatigue it; nay, more, when the sight is wearied by any over-exertion, it is relieved by looking upon an Emerald. For gem-engravers no other means of resting the eye is so agreeable; so effectually by their soft green lustre do they refresh the wearied sight." After reading this just panegyric, or the poetical comparison in Heliodorus:

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[5] These when first brought over were looked upon with much suspicion by jewellers. Garcias ab Horto (1565) has: "Sed et Smaragdi quæ ex Peru Novi Orbis provincia advehuntur, adulterationis suspicione non carent." Exactly the same thing happened in the case of the Brazilian Diamonds in the last century: it was found necessary to send them to India and re-export them before they could be received as genuine at Amsterdam.

[6] In relief his expression seems to imply: emeralds and other green stones were often thus employed by the Romans, more especially for full-faced masks and Cupid's heads: to the latter they seem to have exclusively devoted the green Turquois (Smaragdus Scythicus).

" gems green as a meadow in the spring, but illuminated with a certain oily lustre;" or the rhetoricians' (Symmachus, Mai) description of them in the jewels of the Imperial bride, as " playing with a quivering green" (so distinctive a character of the true stone); can any one longer doubt that the Romans were acquainted with the true Emerald, or suppose that they could have applied such terms of praise to the dull Plasma or opaque Malachite, which so many archæologists have contended were alone understood by the name Smaragdus?

It cannot, however, be denied that the Σμάραγδος of the earlier Greeks signified any kind of green stone that was brighter and more transparent than their Jaspis (our Plasma). In no other way is it possible to understand Theophrastus (23): " Of stones used for signets, some for the sake of their beauty ..... the Smaragdus possesses also some peculiar properties, for it assimilates the colour of water into which it is thrown to its own colour—the stone of middling quality tinging a smaller quantity; the best sort all the water; whilst the worst only colours the liquid directly over and opposite to itself." (Meaning that it will give a greenish cast to the water by the reflection of its own colour, not by *staining* the liquid as most people absurdly understand the passage. But this test is not *now* to be confirmed by experiment.) " It is also good for the eyes: on which account people wear ring-stones made of it, for the sake of looking at them. But it is rare and small in size, unless we choose to believe the stories about the Egyptian kings; for some assert that one was brought to them, amongst other presents from the king of Babylon, four cubits in length by three wide: and that there are now standing dedicated in the temple of Jupiter four obelisks made out of Emerald, forty cubits long, and four cubits wide on one side and three on the other. But these accounts rest merely upon the testimony of their own writers. Of the sort called by many the Bactrian (or Tanos) that at Tyre is the largest, for there *is* a column of tolerable size in the temple of Hercules there: unless indeed it be the spurious Emerald, for there is such a kind found. This last exists in localities easily accessible and well known—in Cyprus in the copper-mines there, and in the island lying over against Chalcedon. In the latter

place they obtain the more peculiar specimens—for this species of gem is mined after like other metals—and it runs in veins in Cyprus quite by itself, and that too in great abundance. Few pieces, however, are met with of sufficient size for a signet-stone, most of them being too small, for which reason they use it for the soldering of gold, for it solders quite as well as the Chrysocolla (Silicious Malachite); and some even suspect both to be of the same nature, as they are certainly both exactly alike in colour. Chrysocolla, however, is found abundantly both in gold-mines, and still more so in copper-mines, as in those at Stobæ. But the Emerald, on the contrary, is rare, as we have already observed; and it appears to be generated from the Jasper,[7] for it is said that once there was found in Cyprus a stone of which the one half was Emerald, the other half Jasper,[8] as being as yet not completely transformed by the action of the fluid. There is a peculiar method of working up this stone so as to give it lustre, for in the native state it has no brilliancy."

It is plain from the above that his Cyprian gem was merely the transparent Chrysocolla, still called the "Copper Emerald;" the remark that it could be used in soldering gold decides this. But that kind qualified as "rare and small in size" was indubitably the genuine one, for the Egyptian mine of the true Emerald had been worked ages before his times.

Pliny (xxxvii. 16) gives a long list of the various species of the Smaragdus, to the number of twelve, and of the localities furnishing each kind. The greatest part of these, the description of which he quotes from *earlier* writers, are evidently only green stones and carbonates of copper of different shades: a distinction must be made where he speaks from his own observation. First in the list he places the Scythian, "the best of all on account of its depth of colour and freedom from flaws (nullis major austeritas aut minus vitii), and as superior to other Emeralds as

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[7] This explains the meaning of the comparison (Apoc. xxi. 11) of the gem illuminating the New Jerusalem "to a most precious stone," ὡς λίθῳ ἰάσπιδι κρυσταλλιζοντι: *i. e.* one combining the Jasper's green with the Crystal's lustre—an exact description of a true Emerald.

[8] Doubtless a crystal of transparent Chrysocolla springing from a piece of green Malachite.

the Emerald itself to other gems." Their extreme *hardness* prevented their being engraved. All these characters, but especially the last, indicate this gem as the Green Ruby, a very rare variety of the Precious Corundum, which indeed ought rather to be called a Green Sapphire. One of large size, belonging to the Hope Collection, exactly coincided with Pliny's description, its colour being the darkest green, aptly designated by the term "austeritas," but far from pleasing; and its freedom from flaws, as contrasted with a true Emerald of the same magnitude, was particularly striking. For no precious stone is more liable to defects than the latter; even the smallest Peruvian Emerald when cut will show one or more flaws within its substance: indeed their total absence is in itself enough to excite suspicion that the gem is merely a glass imitation; for no other precious stone can be more exactly counterfeited by a paste.

It must not, however, be forgotten that the old jewellers, like De Boot (ii. 52), describe their "Oriental" Emerald ("brought from the East Indies, but where found, not known")[9] as both far harder and far deeper in colour, and of a clearer substance than the Peruvian; moreover, always small in size, rarely equalling a hazel-nut. The Ural and Altai mountains have of late years furnished true Emeralds of the finest quality; the Scythian of Pliny may perhaps have been derived from that very source, brought down by the barbarian goldseekers in those regions (the Arimaspi) to the Greek colonies around the Black Sea, or to the Persians on the Caspian. Next in value, as well as in the locality of their origin, were the Bactrian, found, it was said, in the crevices of the rocks during the prevalence of the Etesian winds: "for then especially did they sparkle in the ground when those winds swept away the sands." These, however, were much smaller than the Scythian sort. Dionysius Periegetes describes the Indians as gathering both "verdant Beryls" and grass-green Jaspers out of the gravel of their torrents; apparently including Emeralds under the former designation.

[9] Garcias ab Horto says of the Indian stone: "It is more rare and valuable than the Diamond, and its native place is *hardly* known: inasmuch as no fragments of it are left, but even these, on account of their rarity, are carried off by the merchants.

The Egyptian held the third rank. Pliny notices nothing more of them than their extreme hardness, equal to that of the Scythian: these were extracted from the rocks round about Coptos in the Thebaid. They are not to be confounded with the Ethiopian, found, according to Juba, twenty-five days' journey from Coptos, which were admired for their brilliant green, though not usually clear, nor of the same tint throughout: "acriter virides, sed non facile puri aut concolores."

The two mines last mentioned, the Coptic and the Ethiopian, doubtless furnished their chief supply of the true Emerald to the Romans, as they did even to the Egyptian Caliphs. Extensive traces of these workings are still to be discovered under Mount Zubara, first pointed out by M. Caillaud. His report stimulated Mohammed Ali to reopen the shafts: he had fifty miners employed there when Belzoni visited that region in quest of the ancient Berenice, but their researches had been totally unsuccessful. Belzoni considered that the veins had been quite worked out by the ancients, the vast extent of whose explorations was still attested by the mounds of rubbish covering the ground about the village Sakyat, the former Senskis as existing inscriptions prove. Heliodorus also (Æth. ii. 32) speaks of the Emerald mines as lying in the debateable ground between Egypt and Ethiopia: his introduction of the subject into his romance shows that they were still of importance in the 4th century.[1] From these Sakyat workings Sir G. Wilkinson brought away several specimens of the gem in its quartz matrix, now exhibited in the mineralogical department of the British Museum. They are indeed of a bad, pale colour, and very foul, yet incontestably true Emeralds.

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[1] Mohammed Ben Mansur, in the thirteenth century, describes the Emerald mines as being on the borders of the land of the Negroes, and yet belonging to the kingdom of Egypt, "where they are dug up out of Talc, and also in red earth." The soapy-green kind was found also in the Hedjaz, and therefore was called the Arabian. De Laet thinks the same region continued to supply Emeralds as late as the 17th century: "a very experienced jeweller had assured him that they were then brought secretly to Cairo for sale by the 'Ethiopians,' and that he himself had bought some from a countryman outside the town (who thereupon immediately vanished), a proof that they could not have been brought from India." They may however have been obtained from plundering the mummies.

However, it was not likely that a casual visitor could obtain anything but the refuse of the ancient miners; and a scientific exploration of the locality might produce stones equal in quality to those Emeralds of Imperial times, hereafter to be noticed.

"All the other eight species," says Pliny, "are found in copper-mines." We may therefore, on that ground alone, set them down for Prases, Malachites, perhaps the Green Turquois, &c., without the trouble of farther investigation. The best amongst these was the Cyprian, "the merit of which lay in their colour, which was neither transparent nor diluted, but oily and liquid; and in whatever way it be viewed, resembled the clearest sea-water, so as to be equally transparent and lustrous:" *i. e.* sending out its colour, and admitting the eye ("pariter que ut traluceat et niteat: hoc est ut colorem expellat, aciem recipiat"). There are certain Prases occasionally met with amongst antique intagli of a good period, which, from the extraordinary richness and brightness of their green, can with difficulty be distinguished by the eye alone from Peruvian Emeralds: there can be little doubt these are the gems Pliny here describes. "It is said that the tomb of Hermias, a prince of that island, which stood on the coast near the tunny-fishery, was surmounted by a marble lion, the eyes of which were made of these Emeralds (a proof of their large size and little value), and shot forth such lustre upon the sea as to scare away the fish; nor could the cause for a long time be discovered, until the gems in the eyes were changed." Curiously enough a marble lion was recently brought to the British Museum from Cnidos, the pupils of whose eyes were deeply hollowed out, as if for the reception of some gem of an appropriate colour. Democritus seems to have had in view the Turquois when he "classed in this family (as Pliny guardedly expresses it) the Hermiæan and the Persian kinds: the former, globose and fatty (extumescentes pinguiter); the Persian not indeed transparent, but of an agreeable equal colour, filling the sight, though not suffering it to penetrate them, like the eyes of cats and panthers, for they too shine, but are not transparent. These same Persian stones look dull in the sunshine, but grow bright in the shade, and show themselves from a greater distance than the other sorts." Their great defect besides, common to all

the latter class, was their exhibiting a tinge of the colour of gall or of fresh oil (acris olei). In the sunshine they were bright and pure, but *not green*. Again he remarks (which can only apply to the Turquois) a peculiar defect in this class, that their green hue fades away by time, and that they are injured by exposure to the sun. As for his Median kind, there can be no doubt it was nothing but Malachite, for "they exhibit a very deep degree of green, and sometimes of the Lapis-lazuli colour. They are of a wavy pattern, and contain images of different objects, as for instance of poppies or birds, whelps, feathers, hairs, and such-like things. Such as are not perfectly green are improved by steeping in wine and oil."[2] This species exceeded all others in magnitude. Juba stated that stones like the Median were found plentifully in Mount Taygetus in Laconia, and also in Sicily.

The supply of those from Chalcedon (mentioned by Theophrastus), had ceased in Pliny's times in consequence of the failure of the copper mines there; but the locality was still known by the name Mons Smaragdites: "but," adds he, "they were always of little value, and very small: They were brittle, and of a varying colour, like the green feathers in the tails of peacocks, or on pigeons' necks, shining more or less according to the angle at which they were held: yet at the same time full of veins and of scales."[3] All which shows, as before, they were only crystals of transparent Chrysocolla.[4]

But, when Pliny is speaking for himself, the case is very different; the Smaragdus of Nero's age must be restricted to the true Emerald, perhaps including the Green Ruby. His remark, that "such Emeralds as have a plain surface reflect objects like a mirror," is singularly correct, and attests his accu-

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[2] The very remark Ben Mansur makes concerning the Malachite, doubtless a traditionary process for its improvement in tint.

[3] "There was a defect peculiar to this kind, termed *Sarcion, i. e.* a fleshiness in the stone," meaning a red patch or vein.

[4] Mohammed Ben Mansur divides the Emerald into seven classes according to the colour: 1. The grass-green, of a beautiful clear colour like the little worm often seen in the grass. 2. The Basil-green. 3. The Leaf-green. 4. The Verdigris-green. 5. The Euphorbium-green. 6. The Myrtle-green. 7. The Soap-green. (This last seems to be the bad, pale, opaque quality resembling frozen oil.)

rate acquaintance with the peculiar properties of the gem. For a large flat Emerald, if held so as to reflect the light, will assume the exact appearance of being silvered at the back: its green disappears when its plane is brought to a certain angle with the ray of light; and it will seem exactly like a fragment of looking-glass in the same position. This singular change is not observable in any other coloured stone. Similarly Mahommed Ben Mansur lays down that the distinction between the Emerald and the other stones like it, viz. the Jasper, the Green Laal (Spinel), and the Mina (Green Glass) lies in the *polish*. And again, "the first-class stone, *Saikali*, the clear, polished, reflects whatever is held before it like polished steel."

The huge Smaragdi mentioned (under reservation) by Theophrastus, as standing in the Egyptian and Syrian temples, were made probably of Green Jaspers, or Malachites, artfully cemented together, or perhaps of glass. But the dimensions of such obelisks and columns must nevertheless have been wonderfully magnified by the reporters. Apion, in the reign of Tiberius, had mentioned a Colossus of Serapis as then standing in the Labyrinth, and nine cubits high, made out of Smaragdus. The Alexandrians were ever famous for their glass-manufacture, so that such figures, although their size has doubtless been enormously exaggerated, may actually have been executed in some vitreous composition, represented to the credulous visitor as the real Emerald. Such in truth was the case with the famous Sacro Catino of the Cathedral at Genoa, traditionally believed to have been used by Christ at the institution of the Lord's Supper. According to Erasmus Stella (1517), the Genoese had a plausible story accounting to the sceptical few for the presence of a vessel of such inestimable value upon the humble table where the Passover was celebrated. It figured at the time among the banqueting-plate of King Herod, and had been forwarded to Jerusalem, whither it was his intention to come from Galilee to keep the Feast: but the King, having by Divine interposition, altered his mind, his dinner-service was unceremoniously borrowed for their Master's use by the Disciples. Gesner relates that a monastery near Lyons, still (in 1565) boasted of an opposition Emerald dish, according to them the only authentic

one, but much smaller and far less famed than the one at Genoa. This celebrated relic had been assigned to the Republic at the capture of Cæsarea in 1101, as an equivalent for a large sum of money due from the Crusaders. The State pawned it in 1319 for 1200 marcs of gold (38,400*l.*), and *redeemed it again*, a satisfactory evidence of their belief in the reality of the material as well as in its sanctity. It was a large dish of a transparent rich green substance, believed through all those ages to be a single Emerald of incredible value, but which the investigating incredulity of the French, when masters of the city, in 1800, at length tested, and found to be merely glass. Similarly the noted Emerald of the Abbey Richenau near Costanz, the gift of Charlemagne, turned out, when critically examined in the last century, a counterfeit of the same kind. Such also was without doubt the famous "Table of Solomon," found by the Arab invaders in the Gothic treasury at Toledo, which Elmacin describes as a table of considerable size, one single piece of solid Emerald, encircled with three rows of fine pearls, supported upon 365 feet of gems and massy gold, and estimated at the price of 500,000 aurei.[5]

It may, however, be stated here that the antique glass Emeralds possess colour, lustre, and hardness in a degree far superior to the modern pastes. One found at Rome that had been re-cut and set in a gold ring eclipsed in beauty almost every real stone of the kind ever seen by me: in fact it is a usual practice there amongst the gem-dealers, on obtaining a fine green paste, to get it re-cut and facetted for a ring-stone, and as such to obtain a high price for it from the unwary dilettante. The Cingalese anxiously seek after the thick bottoms of our wine-bottles, out of which they cut very fine Emeralds, which they dispose of at high prices to the "steam-boat gentlemans," exactly as Garcias ab Horto, physician to the Viceroy of Goa, describes the Indians there as doing for the benefit of the Portuguese, three centuries

[5] This had formed part of Alaric's Roman spoils, subsequently distributed amongst the capitals of the newly-formed Gothic kingdoms of Aquitaine and Spain. Procopius (B. G. i. p. 343) says that the Franks eagerly pressed the siege of Narbonne in the belief that it contained the royal treasures carried off by Alaric from the sack of Rome, amongst which were the vessels of Solomon adorned with Emeralds.

ago. The Brighton Emeralds, so largely purchased by visitors, are of similar origin: the broken bottles thrown purposely into the sea by the lapidaries of the place are, by the attrition of the shingle, speedily converted into the form of natural pebbles.

Nero, who was extremely shortsighted[6] (Neroni oculi hebetes, nisi quum ad prope admota conniveret, Pliny xi. 54), used to view the combats of gladiators in the arena through an Emerald (smaragdo spectabat). This stone must have been hollowed out at the back (as many antique gems, especially Carbuncles, are still found to be), and thus have acted as a concave lens in assisting his sight to distinguish clearly what was going on so far below the imperial seat. But this virtue then must have been ascribed to the material, not to the form of the stone, for the looking at an Emerald was by the ancients considered extremely beneficial to the sight—a notion that prevailed as early as the times of Theophrastus, who states that people wore Emeralds set in their rings for this very purpose.[7] Had it not been for this confusion of ideas, the invention of spectacles, at least for myopes, would have been anticipated by more than a thousand years. Some commentators (to begin with Marbodus) have absurdly supposed that Nero employed a flat "table" Emerald as a mirror, to reflect the distant combat: such writers could never themselves have suffered from shortsightedness, or they would have been well aware that to an eye so formed, the reflection of a distant scene would be but obscurity doubly obscured. But had the Emerald been employed on these occasions merely as a mirror, Pliny would have used the expression "in smaragdo," not "smaragdo" simply, which last can only signify "by the aid of an Emerald." The explanation of the concave lens is supported by the obscure remark of Pliny a few

[6] Any one that has examined the portraits of this emperor on a gem or a well-preserved medal will at once discover from the extraordinary size and fulness of his eyes how very shortsighted he must have been. Curiously enough, myopism is still in Italy almost a distinctive peculiarity of aristocratic birth.

[7] Pliny notices that gem-engravers were accustomed to refresh their wearied eyes, after the excessive straining of them required in their work, by gazing for some minutes upon an Emerald kept at hand for that use.

lines before, "they are usually concave so as to concentrate the sight" (ut visum colligant). And Solinus actually describes them (xx.) as both convex and concave in form; and the test of their goodness: "if they be transparent, if when globose they colour neighbouring objects by the reflection of their lustre, or when concave image back the faces of those looking into them."[8]

Epiphanius informs us that even in his times (the close of the 4th century), the name Neronian was given to a kind of Emerald particularly austere and green in tint, transparent, and lustrous. This epithet arose from a discovery attributed either to Nero or Domitian, of a recipe for improving the colour of the gem, by macerating it in oil left standing in a copper vessel until it had imbibed sufficient verdigris to turn it green. By others, this method of tinging the stone was attributed to an ancient painter or gem-engraver, the namesake of the Emperor.[9]

The Hindoos of every age have greatly admired the Emerald, especially when formed into a pear-drop, pierced at the small end and worn as a pendant in the ear. They also employ it much in bracelets; and many a glorious gem of this species, as well as of the Sapphire, have they remorselessly ruined by drilling a hole through its centre for the purpose of stringing it as a bead. One of the finest ever found was to be seen thus maltreated upon the arm of Runjeet Singh: and the largest and finest Sapphire that has come under my own notice had been similarly disfigured. Such gems, in order to be used in European

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[8] One would conclude from these expressions that the Romans hollowed out the back of the Emerald in order to give it lustre, as we know was their frequent practice with the Carbuncle and the Guarnaccino. A very fine Prase, which may have passed for the superior gem, thus treated, has come under my notice: the intaglio is Europa on the Bull.

[9] By the later Greeks and Latins "Prasinus" is used to distinguish the true Emerald; the old term Smaragdus, from the number of different stones it had been applied to, having evidently been abandoned as too indefinite. *Prasinus* must not however be confounded with *Prasius*, always a common gem. That colour of the circus, ever the most popular of the four both with Cæsar and canaille, from Nero, in Juvenal's time, — "clamor, eventum *viridis* quo colligo panni"—down to Justinian, was appropriately given to the gem of gems.

jewelry, must be cut in two, as the only means of getting rid of the unsightly perforation: and thus one gem of unparalleled magnitude is necessarily reduced into a pair of only ordinary dimensions. Such has been the Indian custom from time immemorial, as appears from the description of Persine's necklaces, so poetically described by Heliodorus (Æth. ii. 30): "So saying, from a little pouch he wore under his arm-pit, he took out and showed me an astonishing lot of precious stones: for amongst them were pearls as big as a small hazel-nut, perfectly round, and of the most dazzling whiteness; Emeralds likewise and Hyacinths; the former green like a meadow in the spring, but illuminated with a certain oily lustre; whilst the latter mimicked the colour of the shallow sea under the shadow of a precipitous rock, when it is slightly ruffled by the breeze, and casts a violet tinge upon the bottom." Tavernier notices that in his day every Hindoo that could afford it, wore in his ears a Ruby or an Emerald strung between two pearls. So composed appears the triple ear-drop seen in the portraits of the Sassanian queens, and which best explains the disputed meaning of the τρίγληνα, with which Homer (xiv. 183) adorns the ears of Juno.

In Pliny's age, such was the estimation in which the Emerald was held on account of its beauty and value, that, "by the common consent of mankind, they were spared, being not allowed to be engraved." He quotes indeed from some early Greek author (xxxvii. 3) a story to illustrate the (professional) vanity of the musician Ismenias, in Alexander's reign, who, having heard of a smaragdus on sale in Cyprus, engraved with an Amymone, at the price of six gold pieces, sent for it; and when his agent, having by chaffering reduced the price to four, brought back the ring and the surplus, pretended to take offence at the insult offered the gem's dignity by this beating down of the price. But the locality, the age, and the trifling value of the stone, all go to prove that nothing more than a Prase is here understood by the term Smaragdus. Pliny's statement indeed is fully borne out by those rings that have come down to us intact from Roman times, which invariably present their Emeralds unengraved, and for the most part in their native irregular form, with but a slight polish given to the surface: of such, the Devonshire Collection contains

no less than three; indeed they are of tolerably frequent occurrence. But true Emeralds, with really antique intagli upon them, are amongst the rarest of the rare, and appear none of them referable to an earlier date than the luxurious age of Hadrian. In fact, the best stones, both as to quality and the style of art, examined by myself, presented, one, this Emperor's head; the other that of his consort Sabina; a third the heads of both facing each other. It is curious so large a proportion of the works in so rare a material should belong to this prince's reign. Perhaps his love for Egyptian ideas, and long sojourn in that country, may have stimulated the workings of the Zubara mines, the main source of the supply. This transient revival of the Egyptian religion has also produced a miracle of the glyptic art, embodying one of its ideas: a head of the Solar Lion, the Alexandrian Cneph, giving in its impression a lion's head standing out in full relief, with gaping jaws full of life and fury; the stone itself of the finest colour, purity, and lustre, and in itself of considerable intrinsic value (Fould, the late). The Devonshire Parure also possesses (Bandeau, No. 11) a large and beautiful stone cut into a gorgon's head in high relief, which has every mark of being an antique work of the same period: in fact it is hardly possible to conceive a modern hand venturing to convert into a material for art an ornamental stone so costly as this unusually large and pure example. The baser specimens from the Zubara mines—cloudy, full of flaws, almost opaque, aptly compared by Mohammed Ben Mansur to green soap—were in favour for amulets. Pliny quotes the impudent pretence of the Magi, "made in contempt and ridicule of mankind," that Emeralds engraved with figures of eagles or beetles possessed mighty virtues in conciliating the favour of princes, and in averting tempests. One of the most singular of these amulets belonged formerly to the Praun Gems—a head of Jupiter within a coiled serpent resting upon a crocodile, surrounded by emblems of the planets; and bearing much analogy to those Alexandrian medals of Antoninus Pius, the devices on which are supposed to indicate the commencement of a Sothiac Period. The same Cabinet also possessed a Gnostic legend of several lines upon a similar material.

The generic name Smaragdus is undoubtedly the Greek form of the Persian "Samarrud," as all the productions of the East retained amongst the ancients their Oriental names, more or less modified according to the greater or less degree of harshness in their original forms, just as we have "Margarita" from "Merwerid," "Hyacinthus" from "Jacut," and "Sardius" from "Sered," and, more curiously, "Almas" appearing as "Adamas," with the implied idea of invincibility, according to the same law that converted "Alfas" into "Elephas."

Emeralds were employed in preference to all other gems by the Persians for adorning those jewelled goblets which owed their origin to their luxurious pomp. Thus Theophrastus (35) describes them (including perhaps the Turquois) as the gems used for the *Λιθοκόλλητα*, and collected by horsemen in the deserts, which Pliny, going a little more into details, informs us were the Bactrian sort. Such a mode of ornamentation was long kept up in Persia. Mohammed Ben Mansur says, "Several bits of Emerald united together upon one surface, by means of *mina*, are called Astar." This art flourished amongst the Romans. Pliny indignantly exclaims, "We *weave* cups out of Emeralds," *i. e.* they were connected together into a continuous whole by means of a gold skeleton frame, like the Byzantine imitations of the same in enamel; and Martial talks of a single cup robbing many a finger of its wonted decoration (xiv. 109):—

> "Gemmatum Scythicis ut luceat ignibus aurum
> Adspice, quot digitos exuit iste calix!"

Hence the tradition, mentioned by Procopius, that Solomon's sacred vessels were of this character, which in its turn originated the legend of the Sacro Catino.

Treatises were extant in Pliny's time (75), showing how false Emeralds might be made by staining rock-crystal, as well as other gems—a fraud which he terms the most lucrative in the world. This was probably done by plunging the heated crystal into verdigris dissolved in turpentine. The crystal becomes full of minute cracks, into which the colouring fluid insinuates itself, and tinges the entire substance. The great art is so to regulate

the operation that these cracks do not become too conspicuous upon the surface.[1]

De Boot (ii. 53) gives a long list of the medicinal virtues of the Emerald, then firmly believed in. If worn, it was a preservative against epilepsy (as Marbodus too teaches), cured the dysentery, and preserved the chastity of the wearer, or else betrayed its violation by immediately bursting into fragments.[2] De Boot gives a receipt for preparing the *Tinctura Smaragdi*—a most efficacious medicine in dysentery, epilepsy, and malignant fever.

In the Middle Ages the value of this gem was enormous. Fran. Maria, Prince of Urbino, paid 113 gold pieces for an Oriental Emerald weighing only 2 carats. Cellini puts it at 400 gold scudi the carat, or four times his estimation of the Diamond.

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[1] "The same Democritus discovered the method of softening ivory, and how a stone by *boiling* can be converted into an *Emerald*, by which process (coctura) artificial gems are stained in our times." (Seneca, Ep. 90, 33). This appears like an allusion to the staining of Crystal: "calculus" being usually understood of a white Quartz pebble—such as Pliny notes served as ingredients in glass-making.

[2] "Agricola, si pendulus cutem tangat illius qui actum venereum exercet, disrumpi existimat. Id si in quovis actu legitimo vel illegitimo contingat, necesse est vel motum vel halitum seminalem in Smaragdum agere, nisi metaphysica facultas ipsi insideat aliqua, quæ nulla ratione investigari possit." De Boot, p. 200. "Jam vero apud omnes constat lapidem hunc rerum venerearum impatientem esse. Ut etiam Albertus ille Magnus adseverare non dubitarit regi Hungariæ cum uxore rem habenti, smaragdum quam in annulo portabat in tres divulsam fuisse partes." Ruæus, 'De Gemmis,' ii. 33.

SOLIS GEMMA.

Solis Gemma, described by Pliny (67) as "colourless, but diffusing brilliant rays in a circle after the fashion of that luminary." This exactly describes the Adularian Felspar, now however known to lapidaries as the Moonstone, from the silvery radiance of the large orb that floats upon its convex surface. Sometimes the ground has a slight tinge of the greenish-yellow peculiar to the Cat's eye. Though now abundantly produced in Mount Adula of the Alps, whence its epithet Adularian, the best examples come from Ceylon: therefore there can be little doubt the Romans had received consignments of it amongst the other products of Taprobane.

Pliny's Selenitis (Moonstone) seems to be a variety of the last, "shining with a yellow lustre from a colourless ground, containing an image of the moon, which (if the story be true) daily waxes or wanes according to the state of that luminary.[1] It is said to be found in Arabia." Marbodus, improving upon this, makes the *stone itself* increase or decrease proportionally with the moon, whence it derived the title of the Sacred Stone.

Orpheus, however, differs from Pliny in his description of the "Gem of the Sun" (388), of which he makes two kinds. "In both, there grow real rays, straight, shining, and in appearance like unto hairs; but the colour of the stones is different: one of them you would deem a Crystal, but the other is exactly like

[1] The original notion doubtless being that it was the Moon's *image* in the gem that sympathised with her changes, the mediæval love of the marvellous readily transferred this property to the entire bulk of the stone. It must be observed that Marbodus describes its colour as that of the Jasper or the Emerald—another indication that he had the true Ceylonese gem in view.

the Chrysolite, and if it did not contain the hairs it would be a Chrysolite." Now the first of these is evidently the Venus-hair Crystal—a Crystal of Quartz of extreme brilliancy, full of long straight fibres of asbestos, like the finest hairs inclosed within its substance. This attribution is confirmed by an intaglio discovered by me amongst the Marlborough Gems—a figure of Sol engraved upon such a gem, marking it for his own peculiar property. The yellow variety it is more difficult to identify.

The modern Venus-hair Crystal is not however the Veneris Crinis of Pliny; for that was extremely black and lustrous, containing in its substance the appearance of red hairs.

No wonder that so singular a phenomenon should have been regarded as the sign of wondrous inherent virtues. "Phœbus hath planted in both species a mighty spirit that gives glory and the heroic form to whosoever shall wear them with due understanding," adds Orpheus.

SUCCINUM: Ἤλεκτρον: *Amber.*

AMBER claims the highest antiquity in the list of Precious Stones used for personal ornament. It was the only one known to the early Greeks. Homer mentions no gem in his minute description of various jewels, except this, "the gold necklace hung with bits of amber" (*μετὰ δ' ἠλέκτροισιν ἔερτο*), offered by the Phœnician trader to the Queen of Syra (Odys. xv. 460). It is seen, often carved into elegant forms, in the earliest Etruscan jewelry. Amber scarabs alternate with others in Sardonyx, as pendants to the magnificent necklace (known as the Prince di Canino's), the masterpiece of the Etruscan goldsmith. This people, becoming acquainted with the substance from their intercourse with the Gauls, had speedily availed themselves of it as a glyptic material, charmed by its extraordinary lustre, so far superior to that of the ill-polished gems that lay within their reach. Even in the best days of Greece it was held in the highest estimation. Theophrastus (29) speaks of "the Fossil Amber, a stone produced in Liguria, possessing the property of attraction, but rare, and found in only a few countries." Even in Pliny's age, he satirically observes (xxxvii. 12) that "the price of a figurine in it, however small, exceeded that of a living, healthy slave," which we know was by no means inconsiderable. Juvenal represents his rich patron as displaying at his feast a bowl embossed with Beryls, and relievi in Amber "Heliadum crustas."

To the very last, as we see from the article in Epiphanius on the "Lyncurium," there is always an uncertainty whether the Greeks understood Amber or Zircon under that name, or its other form Langurium. Though Theophrastus (28) sufficiently shows that his Lyncurium is a Zircon, by mentioning its extreme hardness, and employment for signet-stones, yet Pliny (13) asserts

that, if the Greek mineralogists did not understand Amber by that name (otherwise, *Langurium*), there was no such thing in existence, and the whole account of its origin was a mere fable.

Pliny, after craving the indulgence of his readers, takes occasion to expose "the love of lying distinguishing the Greeks, since there was some advantage in knowing all their marvellous tales;" and proceeds to enumerate the various fictions by which they had accounted for its origin. The most ancient of these, resting chiefly on the authority of the poets, made it to be the tears of the Electrides, changed into poplars on the banks of the Eridanus, dropped upon the death of their brother Phaëthon. Others made it distil from trees in certain islands far up in the Hadriatic. The explanation of its being the condensed urine of the lynx had also many supporters, and the habitat of these beasts was placed in the north of Italy.[1] Sudines and Metrodorus endeavoured to escape the absurdity of this hypothesis by explaining that the tree producing it in Liguria was called the *Lynx*. Numerous other accounts follow: some placing the mines in Scythia (the favourite ancient cloak for ignorance); others in India; some in Egypt, under the name of *Sacal*, where there seems to be a confusion between it and certain odoriferous resins.

Pytheas, however (about 280 B.C.), gave the correct account that the Gutones, a German tribe dwelling upon the estuary Metonomus, picked it up in spring upon the coast of the island Abalus, or Basilea, a day's sail out at sea, and used it for fuel or sold it to the Teutons. This explains the prevalent Greek notion of Liguria being its native country, inasmuch as from the Northern Sea (the Baltic, the sole locality producing it in marketable quantities) it was carried overland by the Germans into Pannonia, and thence diffused amongst the Heneti, a nation seated at the head of the Adriatic. From these it was procured by the Cisalpine Gauls, a kindred race, whence originated the fable of its being carried down with the stream of the Po. In Pliny's age it was universally worn in necklaces by the Transpadane females (of Lombardy and Piedmont), partly as an orna-

[1] The North of Italy was the same Terra Fabulosa to the earlier Greeks, that India became to the later.

ment, partly as a prophylactic against *goîtres*, to which they were subject in consequence of the bad quality of the water. Thus the early Greeks obtained it from the Teutonic tribes upon the Adriatic, the Etruscans from the Cisalpine Gauls upon their northern frontier.

It is strange the material should have maintained its high value amongst the Romans, in spite of the enormous importation that had gone on ever since the German campaign of Germanicus had opened up a communication with the Baltic. That commander had actually visited with his fleet the island Austeravia, that furnished the chief supply. This place the Romans called *Glæsaria*, from *Glæsum* (whence our glass), the native name for Amber. This locality was distant 600 miles from Carnuntum in Pannonia (Altemburg on the Danube), apparently mentioned here as being the ancient entrepôt where the Teutonic and Roman traders met. When Pliny wrote, the Roman knight was still living who had been despatched by Julian, superintendent of Nero's gladiators, to investigate that coast, and the nature of the trade there. So successful did his expedition prove (Solinus stating that the king there sent Nero a present of 13,000 pounds weight of Amber) that all the weapons and articles used during the games of the amphitheatre, on one particular day, were made of Amber, and the network protecting the lower tier of seats was knotted with it: that is the cords forming it were passed through perforated Amber balls at their intersections. The largest mass imported on this occasion weighed 13 pounds.

Tacitus (Germ. 45) gives the name of the Amber-gatherers as the Æstyi, with the remark that they are a sacred nation, worshippers of the mother of the Gods (Hertha), and resemble the Suevi in customs and appearance, but speak a language like the British. As the mark of their faith, they wore the figure of a wild boar, protected by which they could travel everywhere in safety, even in time of war.

Pliny mentions a singular employment of this substance, which was in the imitation of all the transparent precious stones, but above all the Amethyst; for it could be stained of any colour required. This was done by boiling it in kid's fat and alkanet-root, or else in the murex-blood. Before the wear of its tender surface

betrayed the fraud, it must, thus prepared, have passed for a precious stone of unusual brilliancy, for in refractive power it is only second to the Diamond. In fact so great is the analogy between both, that a theory has been started, and endorsed by eminent scientific names, that the Diamond also is no more than a fossil resin. This idea is supported by the late discovery in such abundance of its black congener the Brazilian Carbonado, which stands in the same relation to the Diamond as Jet does to Amber.

As in our own times the chief part of the Amber furnished by the Baltic finds its way to China, to be there used for burning in powder as incense (very little being now worked up in Europe into ornaments, no longer in fashion here), so Nicias describes the Indians as using it for incense in preference to any other perfume. The Romans distinguished all the varieties we now find. The pale was believed to emit the most agreeable odour (when rubbed), but this and the wax-coloured was the cheapest. More valuable was the yellow (fulvus), especially if transparent and full of fire; but the best was that called Falernian, from its similarity in colour to that wine (like golden sherry), transparent with a soft lustre.

Amongst the other monstrosities of his life, to use Pliny's words, Nero adopted this name in his verses to express the colour of his beloved Poppæa's hair, calling it Amber—no such very monstrous crime, one might think. Hence we may discover that this famous beauty was a blonde with auburn hair, the colour ever esteemed (on account of its rarity amongst them) the most lovely by the nations of the South. Hair of this colour therefore became all the fashion amongst the Roman ladies, and false fronts were largely imported, obtained from the female savages of Germany, and doubtless without much ceremony. They also changed their black locks into red by steeping them in a powerful alkali, thus described by Martial:—

> "Caustica Teutonicos accendit spuma capillos:
> Captiva poteris cultior esse coma."

Pieces of Amber containing insects speedily attracted the notice of the Romans, and guided them, for once, to a correct theory as to its origin; for it was evident that it must have enveloped these foreign bodies whilst yet a liquid exudation from the tree.

Hence they gave it the expressive designation of *Succinum*, or the Gum-stone. The Greek *Electrum* is referred to its supposed connexion with the Sun-god, one of whose titles was *Elector*. Martial has three ingenious epigrams upon a viper (some small reptile), upon an ant, and upon a bee thus imprisoned. The last is—(iv. 32)—

> "Et latet et lucet Phaëthontide condita gutta
> Ut videatur apis nectare clausa suo,
> Dignum tantorum pretium tulit illa laborum
> Credibile est ipsam sic voluisse mori."

Gesner figures as the frontispiece to his book, 'De Natura Fossilium,' a ring carved out of one piece of insectiferous Amber, so ingeniously managed that the insect (a beetle) contained therein, forms the centre and ornament of the shield, as if enchased under a crystal.

Its medical virtues amongst the Romans were not much more extensive than those it is at present popularly believed to possess. It was worn as an amulet by children, but Callistratus laid down that it was of service in every time of life against insanity or stranguries, either taken internally in powder or worn round the neck. This physician gave the name of Chryselectrum to the sort of a clear golden colour, supposed to be of so fiery a quality as to ignite if even brought near a flame. This kind, worn round the neck, cured the ague;[2] ground up with honey and rose-oil was a specific for deafness, and with Attic honey for dimness of sight.

The large circumference of some antique bowls of Amber, occasionally discovered, seem to preclude the possibility of their being hollowed out of a single block. It has been ascertained that by boiling pieces of Amber in turpentine they can be so softened as to be kneaded together into a coherent mass, or moulded to any form. Perhaps the malleable glass mentioned by

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[2] That the wearing an amber-necklace will keep off the attacks of erysipelas in a person subject to them, has been proved by repeated experiment beyond all possibility of doubt. Its action here cannot be explained; but its efficacy as a defence of the throat against chills is evidently due to its extreme warmth when in contact with the skin and the circle of electricity so maintained.

Pliny (xxxvi. 68) and by Petronius (Trimalchios Supper) as a secret discovered in the reign of Tiberius, was some such preparation of Amber made up into vases. *Electrum* also denoted a particular alloy of gold. "Wherever," says Pliny (xxxiii. 23), "the native gold contains one-fifth of silver, it is called Electrum. This occurs in grains in the gold-washings (Canaliensi): it is also made artificially by the addition of silver; but if the proportion of the latter exceed one-fifth, the alloy does not stand the hammer. Electrum was anciently held in esteem, as Homer testifies, who makes the palace of Menelaus resplendent with gold, electrum, silver, and ivory (Od. iv. 73)." But ἤλεκτρον in this passage of Homer more probably signifies amber, as it certainly does in xv. 460. Sophocles, however, employs the word in the later sense (Antig. 1037), coupling the *electrum* from Sardis with the gold of India. By a singular coincidence, the primitive gold coinage of the Lydians is in electrum. It would seem they knew not the art (a difficult process) to separate the silver from the native gold of the Pactolus washings. "Lindus in Rhodes possesses a temple of Minerva, in which Helen has dedicated a cup made of electrum, tradition says, the model of one of her own breasts. It is the peculiarity of electrum (the metal) to be more lustrous than silver by lamplight. The native kind also detects the presence of poison; for then an appearance like the rainbow flies to and fro in the vessel, attended by the crackling of flame, and gives warning by this double indication."

TOPAZIUS: Τοπάζιος: *Peridot.*

This gem derived its name from the island in the Red Sea, 300 stadia (30 miles) off the mainland, where it was first discovered; Juba, quoted by Pliny (32), oddly enough deriving the name from Topazein, which, he says, in the Troglodyte tongue means to seek after, because the island is often lost amidst thick fogs. According to Archelaus, Cytis was the name of the same island, where certain Troglodyte pirates, when hard pressed by famine, as they tore up the herbs and roots there growing for their sustenance, accidentally discovered this gem. Epiphanius has a long and confused story to much the same purpose, but makes Topaze an Indian town, where the stone was found accidentally by some quarrymen, who mistook it for Alabaster, and sold it to Theban traders, who bringing it home, their queen set it in her diadem, upon the middle of her forehead.

Diodorus Siculus (iii. 38) gives a detailed account of this island. It lay out at sea, some distance to the south of the harbour of Aphrodite, was 80 stadia long (10 miles), and called the Isle of Serpents, from the multitude of reptiles formerly infesting it. These had been completely extirpated by the care of the Alexandrian kings. The Topazion here found was a transparent gem, agreeable in aspect, resembling glass, and presenting a wonderful golden appearance. No one was allowed to land there under pain of death, and no boat was allowed to be kept on the island. Provisions for the few soldiers on guard there were brought at intervals from the continent. The gem was not discernible by day, its lustre being then overpowered by the sun's rays, but at night was conspicuous by its brightness; the guards, who divided the island among their patrols, then ran up and covered the luminous spot with a vase of equal size. Next day they go

their rounds, and cut out the patch of rock thus indicated, and deliver it to the proper persons to be polished.

This stone was indubitably our Chrysolite, or Peridot; the distinctive characters of which exactly agree with those pointed out by Pliny. His Topazius was imported from some place in the Red Sea; at present the best come from the Levant, but from an unknown source: it was of a bright yellowish-green, a colour peculiar to itself (in suo virenti genere), and was the softest of all the precious stones, yielding to the file, and suffering from wear. Juba adds that it was found in masses of such magnitude as to serve for a statue, four cubits high, of Arsinoe, queen of Ptolemy Philadelphus, standing in the "Golden Temple:" an exaggerated story, like those noticed under "Emerald," relating to some imitation in glass. It had first been introduced into Egypt in the time of her mother, Berenice I., by Philemon "the admiral," whom we may hence infer had discovered the mine during his expedition against the pirates above mentioned. It was still highly valued in Pliny's age, though somewhat fallen in estimation since the time of its first discovery, when it was "wonderfully admired" (mire placuisse), and preferred to all other gems.

Under the Romans it had recently been met with in the neighbourhood of the Egyptian Thebes; and the lapidaries accurately discriminated the two varieties the Chrysopteron, our Chrysolite; and the Prasoides, our Peridot; the latter "aiming at the exact imitation of the colour of the leek-leaf." For, although the same chemically, both being Silicates of Magnesia coloured by Protoxide of Iron, yet, from the jeweller's point of view, there is a great difference between the Chrysolite and the Peridot. The former is much harder, and the yellow in it greatly predominates over the green: it possesses much of the Diamond's lustre, which it exactly resembles by candle-light, when that tinge is no longer discernible. In the Peridot green is the predominant colour, but slightly modified by yellow; in fact, in the rough it much resembles a rolled pebble of bottle-glass, or a "Brighton Emerald."[1] No wonder that the gem so greatly charmed the

[1] Hence styled by Orpheus (277) ὑαλοειδέες τόπαζοι: the common glass of the ancients having always a green or a blue tinge, because they were ignorant of the secret how to whiten it with manganese.

Greeks, whose sole method of cutting coloured stones was *en cabochon*. Few gems approach it in lustre and richness of hue, and but for its extreme softness it would still hold a high place in the rank of precious stones.[2]

This substance is polished with great difficulty, and only by the use of tripoli moistened with vitriol upon a leaden wheel, a secret discovered in Europe only in the last century. Hence it is not improbable that Theophrastus may have had the Peridot in view when speaking (27) of the peculiar process required to give lustre to the Smaragdus, naturally a dull stone; for in his age the coast of the Red Sea was the only locality supplying the Greeks with the true Emerald, and very possibly the Peridot, at a somewhat earlier period than that allowed by Juba. Certainly the natural brilliancy of the true Emerald prism is its most distinguishing feature, and could not have been much improved by the simple cutting of the Greek lapidary. Some fine Greek intagli occur in Peridot, to be ascribed from their style to the date of its first introduction at the Alexandrian court, but they are of the highest rarity. The Romans appear never to have used the stone for engraving on, deterred either by its softness ensuring the speedy destruction of the intaglio, or else by its high value as a precious stone. Modern works in it, on the contrary, are abundant enough, and to this class will the majority of supposed antiques in Peridot, when critically examined, be found to belong.

Much light is thrown upon the meaning of Theophrastus as above quoted by the following instructive chapter in M. Ben Mansur:—"Abunnasser Farabi, and many other philosophers, hold the Chrysolite for no distinct species, but for a sort of Emerald, than which it is more agreeable and purer. It is divided into three classes: the strong green, middling green, and weak green. It comes from the same mines as the Emerald, and appears to be formed of the same substance, but less perfected. Teifashi says that in his time no Chrysolites were found any longer: those now seen come from Mauritania, and are the relics

[2] The French indeed have a proverb, "Qui a deux Péridots en a un de trop:" but their taste here, as in the matter of the rose-coloured Pearl, has been perverted by fashion. In Italy the stone retains its ancient estimation.

of the army of Alexander. When he with his host had penetrated into the Land of Darkness, where flows the Green Fountain of Life, a voice was heard that the gravel under their feet, green from the reflexion of the fountain, was the 'Gravel of Repentance' (Hassbaen. Medamet). When they returned to the light they found this voice verified; for both they that had picked up this gravel repented, and they that had picked up none: the former, because they had got nothing but Chrysolites (instead of Emeralds); the latter, because they had got nothing at all. Hence is it called the 'Stone of Repentance.'"

Epiphanius relates a curious notion as to his Topazius, which he strangely makes a gem red of colour beyond the Carbuncle, "that if rubbed down upon a physician's hone it does not give out a red juice in accordance with its own colour, but one like milk, and fills as many cups as he that rubs it down may choose, and yet loses nothing at all of its original weight. This juice is a remedy for all diseases of the eyes, and, taken internally, for the dropsy; and is an antidote against the poison of the 'marine grape.'"[3]

The modern Topaz is a totally distinct substance from the Topazius; being a combination of alumina and silica with fluoric acid, extremely hard (reaching 8 on the scale, while the latter only 6), highly electric, and of a vinous orange colour, without any admixture of green. Those used in jewelry come from Brazil. An inferior kind is found in Saxony. It is needless to add that it was totally unknown to the ancients, or to the mediæval writers even as late as De Boot, whose Topaz is either the Oriental yellow Corundum or the large Bohemian yellow Crystals.

As early as the 11th century we find Marbodus describing as the Chrysolithus, the stone now known by that name, Pliny's Chrysopterus. He also divides the Topazius into two kinds: one

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[3] Orpheus says that the Magi ascribe the same powers to the Topazius as to the Lychnis, viz. if thrown into a pot upon the *fire* to prevent its boiling however hot the blaze; but to make it boil over if set upon cold ashes. Now the latter was the *red*. Spinel.

Marbodus says that the Chrysolite strung on a hair out of an ass's tail is of mighty virtue to scare away evil spirits.

bright yellow and hard (our Chrysolite); the other greenish and soft. Thus the name "Topaz" came to be applied to any bright yellow and hard stone that did not to the eye display the distinctive mark of the Chrysolite, a tinge of green, and gradually became restricted to the sense it now bears.

The name *Peridot* can be traced far back. In the Wardrobe Book of 27 Edward I., is entered amongst the jewels of the deceased Bishop of Bath and Wells (escheated to the Crown), "Unus annulus auri cum *pereditis*." This term implied a distinction from the Topazius (our Chrysolite); for the preceding item is, "Unus annulus auri cum topacio." The origin of the word can only be conjectured. The mediæval spelling seems to indicate περίδετος as its source—a name applicable enough to the *banded* plasma, Pliny's *grammatias*, and which may have been transferred by the ignorant Gothic writers to this gem, to distinguish it from the *prasinus*; or, taking the modern spelling, περιδοτὸς would signify a *wager*, for which purpose, as Pliny notes, the ring was perpetually in request: "Argumento est consuetudo vulgi ad sponsiones etiamnum annulo exsiliente, tracta ab eo tempore quo non erat arrha velocior" (xxxiii. 6).

That very elegant gem the Pink Topaz of our jewellers, emulating the Balais in tint and lustre, is not a natural variety, but merely the Brazilian metamorphosed by the action of fire. The change is simply and easily effected by closely enveloping the stone ready cut and polished in German tinder, firmly bound with fine wire; this being kindled, when thoroughly burnt out the colour of the Topaz will be found converted to a clear rose without the least detriment to its original texture or polish.

ZMILAMPIS: ZMILACES: *Cat's-eye?*

Described by Pliny as found in the Euphrates, resembling Proconnesian marble, with a greenish-yellow colour in the centre—terms too vague to be of much assistance in identifying the gem intended, were they not elucidated by the fuller details supplied by the more technical Solinus (xx.): "Zmilaces, a gem picked up in the bed of the Euphrates, in appearance like the Proconnesian marble, except that in the middle convexity of the stone a green thing shines through like the pupil of the eye."

This exactly applies to our Cat's-eye, a transparent Quartz full of minute fibres of Asbestos, and of a yellow hue slightly tinged with green. Opalescent from its constitution, it is always cut in a highly convex form, and of a long oval. The opalescence is thus confined to a narrow vertical streak of light, exactly resembling, from its contrast with the yellowish green of the ground, the pupil of the feline eye. That the ancients knew this stone there can be no doubt; for it is very accurately described, and under its present name of Cat's-eye (Ainol Hurr), by M. Ben Mansur, whose work faithfully represents the state of mineralogical knowledge that had existed long before his day. He places it sixth in his scale of value, next to the Diamond: for strange to say he omits the Opal entirely.

Ceylon furnishes it at present.[1] A perfect gem is yet of considerable value in Europe, but the Hindoos value it above all precious stones after the Diamond.

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[1] As of old, Ben Mansur has: "It is asserted that the Cat's-eye is found in the Jacut-mines, and is formed out of the same substance." The latter were in the island of Saharan, lying 40 parasangs behind the island of Ceylon: and the only source of the gem (except a reported one near Cairo) then known.

Amongst the Marlborough Gems one of the most curious is a singular conversion of a monster Cat's-eye, 1½ inch high, into a lion's head admirably carved out in full relief. The play of colours imparts to the grim mask a vivid reality of life and fury, rendering it a most successful achievement of the school, the Cinque-cento that produced it, whose taste, ever stimulated by the love of the grotesque, revelled in similar analogies between the subject and the material. To the same age is due the Hope "Mexican Sun-Opal," 1• × ¾ inch in size, richly lustred with shades of red, green, and blue, and as appropriately converted into a head of Phœbus.

The Italian name is Belocchio, evidently a corruption of the Beli Oculus of the Romans; but the name has been transferred to the Cat's-eye on no sufficient grounds, the Beli Oculus (Baal's-eye) having been merely some brightly-shaded variety of the Eye-Onyx: "for in it (55) a transparent white belt encloses a black pupil, having a golden colour shining out from the centre, and on account of its appearance consecrated to the supreme god of Assyria." These terms prove that three distinct colours were necessary to compose the Beli-Oculus, whereas the Cat's-eye presents one uniform tint, the pupil being formed by the mere reflexion of light, and shifting about according as the stone is turned.

The Beli Oculus of De Boot's age still retains its ancient meaning. He describes it as a minute Eye-Onyx of sovereign virtue for all diseases of the eyes (on the strength of its name no doubt), being placed under the lid, and allowed to work its way into the corner.

Pliny distinguishes, by significant Greek epithets, several varieties of the Eye-Onyx, as the Leucopthalmus, of a fiery red enclosing the figure of an eye in opaque white and black (for the pupil); and the same stone seems again designated as the Lycophthalmus (Wolf's-eye), but presenting four distinct colours, a fiery red enclosing one the colour of blood, in the centre of which was a black spot surrounded by a circle of opaque white, precisely representing the same organ in the wolf. The Triophthalmus, produced with the Onyx, presented the figure of a triple human eye.

Examples of the Eye-Onyx, exactly agreeing with the above descriptions, are often to be seen mounted in antique rings of the Lower Empire, and yet more so in those of mediæval times.[2] Having their natural form but rarely interfered with by the introduction of an intaglio, it may be concluded that they were reserved intact as amulets preservative of the wearer's sight.

[2] There is a beautiful example (with two *eyes*) in a Gothic setting for a pendant in the Royal Gems.

VITRUM ANNULARE: Λίθος χυτὴ: λιθινὸν χυτὸν: *Pastes.*

"PASTE," from the Italian *pasta*, is most strangely changed from its primary meaning. Who could discern any analogy between a bit of glass and dough, the proper sense of the word? It comes in fact from *pastus*, food; and the grand staple of the Southern Italian's dinner has been from time immemorial the dough of the *gran duro* (the ancient *far*) moulded into all kinds of curious forms, but all going under the generic name of *paste*. From the same root springs the pâte of the French, and our own pasty, which varies less from the original. Hence the Italians, when they revived the fabrication of imitative gems, applied to the softened plastic material the familiar household word.

Pastes are imitations in glass of the precious stones, and also of engraved gems, camei and intagli, transparent and opaque; and the process of the manufacture is the following:—A small iron case of the diameter required is filled with a mixture of fine tripoli and pipeclay moistened, upon which is made an impression from the gem to be copied. This matrix is then thoroughly dried, and a bit of glass of the proper colour laid flat upon it. If a stone of different strata has to be imitated, so many layers of different-coloured glass are piled upon each other. The whole is next placed within a furnace, and watched until the glass is just beginning to melt, when the softened mass is immediately pressed down upon the mould by means of an iron spatula coated with French chalk, in order to prevent adhesion. It is then removed from the furnace, and annealed or suffered to cool gradually at its mouth, when the glass, after cleaning out, will be found to have taken a wonderfully sharp impression of the stamp upon the tripoli, but in reverse, whether the prototype be in relievo or incavo. When a cameo is the model, all the undercutting must

be stopped up with wax before taking the cast, otherwise it tears away the soft matrix when withdrawn; and on this account camei in paste are never so satisfactory as intagli. If it be wished to imitate a gem full of internal flaws, like the Carbuncle or the Emerald, the effect is produced by omitting the annealing, and throwing the paste, still hot, into cold water.

The process followed by the ancients was doubtless in principle the same, except that it is evident their moulds were taken in a much coarser material (probably in terra-cotta, on which point more will be said in another chapter), for antique pastes have a much rougher surface than the modern, and are full of air-bubbles. One singular property, however, distinguishes the ancient: they are much harder than window-glass, and will scratch it as readily as does a splinter of flint; whereas all modern glass, if coloured, is softer than the transparent kind. This is due to its different composition, for at present the German glass, made entirely with soda, is much harder (even resisting the file) than the English, into the composition of which enters a large proportion of lead. De Boot tells us that in his time (1609) rock-crystal pounded was used in the celebrated glass-houses of Venice in making their best articles; and also generally by the Italians in the manufacture of false gems (an art they were then famous for), for which he, sapient old alchemist as he was, gives many curious and valuable recipes. In the present day the trade is transferred to Paris; and it will be seen by a reference to Barbot's article on *Strass*, how important an ingredient crystal is still regarded. Crystal in fact being the purest form of silex, is very superior to the silicious sand now employed for the sake of economy in the manufacture. The use of this component can be traced back to the earliest times, for according to Pliny (xxxvi. 66), "some assert that in India glass is made out of pounded crystal, and in consequence no other sort is comparable to the Indian." The same fact seems to be implied in the vague expressions of Theophrastus (49): "For if glass be made, as is reported, out of the *hyalites*, this substance also is the product of condensation."

Besides this superior hardness, another supposed criterion of an antique paste is the beautiful iridescence, often coating its

surface, produced by the oxidising of the glass from the action of the salts of the earth. Another is the porous, bubbly texture, not only of the surface, but of the entire substance. The latter peculiarity does indeed distinguish them from those of the modern fabrique, which, when they counterfeit the transparent gems, are pure and homogeneous throughout, being in fact made of what is technically called "pot-metal," or glass stained of one colour. These, from the greater fusibility of the composition, usually exhibit a polished surface within the intaglio, not far below that of the real stone whence it was derived. But it must be remembered that this hardness would be found equally in modern pastes, supposing them made out of the fragments of ancient glass, so abundantly procurable about Rome whenever the soil is disturbed, whilst the roughness of the surface entirely depends upon the coarseness of the matrix, which may be obtained at pleasure. As for the iridescence on which some amateurs set such store, I strongly suspect it is often produced by chemical means. But indeed bits of glass, after a few years' exposure to the acids of a garden soil, often turn up with surfaces fully as iridescent as the most indubitable antique of the class.

As counterfeits of precious stones, Pastes can be traced back to the most remote ages of antiquity. Herodotus describes the pendants put in the ears of the sacred crocodiles, under the name of λιθινά χυτὰ,[1] "fused gems," a curious yet accurate periphrasis. Such pendants, in blue or green transparent pastes, figure much more frequently than real stones in those elegant and elaborate ear-rings that carry us back to the early ages of

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[1] Epinicus ridiculed the bombastic historian Mnesiptolemus, in a play called after him, for his pompous description of King Seleucus taking his morning draught — εν σκυφφ χυτης λιθου (Athen. x. 40). It is evident from the remarks of Theophrastus, cited further on, that the Greeks of Alexander's times had not the art of glass-making. Hence a glass bowl was not unworthy of the lord of all Asia. By Pliny's age, four centuries later, the manufacture was flourishing all over Spain and Gaul (xxxvi. 66). The proficiency of the Celts in the newly-introduced art is convincingly displayed in the admirable composition of the so-called Druidical beads of opaque and transparent colours tastefully combined, and the making of which by exactly the same process was kept up at Murano, Venice, almost to modern times.

Greek and Etruscan prosperity. They also decorate the necklaces of the same period of art. Though their surface is now dulled by Time's corroding tooth, yet doubtless, when first sent out from the jeweller's shop at Sardis or Clusium, they displayed more than the polish and the beauty of the Emeralds, Sapphires, and Rubies, whose unattainable rarity they were intended to replace. This notice of early Pastes Fortune has put it in my power to illustrate most strikingly by the description of two extraordinary specimens now adorning the choice collection of Mr. Bale, acquired from that of L. Fould. The first, an ellipse about an inch in length, is translucent, and streaked with wavy clouds of green, like the Venetian *schmelze*, through which layers of gold aventurine are disseminated in undulations, presenting the most charming contrasts ever achieved in this art. A perforation through its axis shows it was designed to form the centre ornament of a necklace. The other is on many accounts yet more remarkable. The Paste, of the same form as the preceding, is opaque, and composed of wavy patterns in the most brilliant colours, arranged as in the *mille-fiore* glass of Venice, But the most interesting circumstance is its retaining its original setting, being encased in a gold collet covered with a cable plait in the usual Etruscan taste, and furnished with a massy three-sided shank, affixed to the side with pins, so that the jewel is mounted like a scarabeoid. The weight and elaborateness of the setting manifests the high value set upon the Paste by its original Etruscan owner. Could he have taken it for some rare and unique production of nature; or was it merely prized as an example of the skill of the Egyptian glass-worker, brought for a precious gift to some wealthy *Lucumo?* The examination of this skilful combination of numerous patterns, much resembling the old Italian mosaic "a tapete," seems to throw light upon the obscure allusion to some such manufacture given by Theophrastus, of the "stones brought from Asia," and already quoted under *Sardonyx*, as composed of earthy minerals, some pulverised, others softened by fire, and so put together.

The Egyptian glass-workers of the very earliest times produced mosaics most minutely finished, and sufficiently small to be set in rings and in pendants to necklaces. The mode was in-

genious, although extremely simple in practice. A number of fine rods of coloured glass were arranged together in a bundle so that their *ends* composed the pattern wished, as a bird or a flower, exactly as now the makers of Tunbridge ware do with their slips of differently-coloured woods. This bundle was then enclosed in a coating of pot-metal, usually opaque blue glass; and the whole mass being fused sufficiently to run all the rods together into a compact body, was lastly drawn out to the diameter required. In this way all the rods were equally attenuated without altering their relative position; and the external coating, when the mass was cut across, became the ground of a miniature mosaic, apparently the production of inconceivable dexterity and niceness of touch. Each section of the whole necessarily presented the same pattern, without the slightest variation in its shades and outlines. The most exquisite specimen in existence, once the Duchess of Devonshire's, is now in the British Museum. It is a square tablet about an inch wide, exhibiting, upon a ground of the most beautiful blue, a kneeling winged goddess, Sate. In the figure the junction of the threads defies the nicest scrutiny, and produces the effect of an exquisitely painted miniature in the brightest colours, brought out by the high polish given in the finish to the surface. The back, left rough, clearly exhibits the rationale of the process.

Under "Emerald" something has been said respecting the perfection to which the art of making false gems was carried by the Romans. Pliny, in his description of the precious stones, frequently alludes to the difficulty of detecting their counterfeits in glass. In the making of drinking vessels and for other ornamental purposes, he enumerates the following varieties:— "Glass resembling obsidian[2] is made for dishes (escaria vasa); also a sort entirely red and opaque, called *Hæmatinon;* an opaque white also, and imitations of the Agate, the Sapphire, the Lapis-lazuli, and all other colours."[3] Specimens of all these kinds are

[2] On the strength of this certain pedants of the last century took to designating all antique pastes, irrespective of their colour, by the name of *Obsidian* — a piece of absurdity which greatly puzzles one at first in the catalogues of the time; *e. g.* in the Marlborough.

[3] The most admired however was the pure colourless, as much like

met with in abundance amongst other Roman remains even in this country, more particularly the imitations of the Sapphire, a transparent body of the richest blue. Such fragments of the different varieties are collected by the lapidaries in Rome: when cut and polished they are set in bracelets or brooches; and variegated as they are with bright colours capriciously arranged, they show like Agates of a novel and superior species to any from the laboratory of Nature. Translucent blue traversed with opaque white stripes, and green similarly diversified with red, were patterns in great demand amongst the ancients, to judge from the abundance of such pieces. But their imitation of the Lapis-lazuli was the most successful of all; and their reproductions of intagli in this material are the most difficult to distinguish from the real stone, such is their homogeneousness of substance and purity of colour. In such is to be seen the finest paste cameo known (in the glass department of the British Museum), a three-quarter figure of Bonus Eventus (so inscribed) holding a cornucopia.[4] The slab is about 8 inches square, and the figure, which is in half relief, has been carefully gone over with the tool after the manner of a cameo in stone.[5] Caylus (ii. Pl. 81) has engraved an admirable Medusa, $4 \times 3\frac{1}{2}$ inches in size, in a paste similarly finished off with the diamond-point; and also a head of Victory set in a massy bronze ring, which he describes as a per-

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crystal as possible. Merely because this was the most difficult to produce, any iron in the sand giving the glass a blue tint such as the commoner vessels of the Romans usually exhibit. This tint is now got rid of by a mixture of manganese, hence called "glass-soap" by the trade. Old women used to go about Rome buying up broken glasses in exchange for brimstone-matches, as Martial tells us "sulfurato ramento Vatiniorum proxeneta fractorum," which shows the materials for fine glass (the Syrian sand) were somewhat expensive in Italy.

[4] The strongly-defined character of the profile bespeaks it the portrait of some youthful Cæsar; and one seems to recognise in it the surly physiognomy of Caracalla, of whom so many gems exist.

[5] This is by far the largest paste known to me; but it is far surpassed in this respect by another in the Vatican, "The Triumph of Bacchus," which, according to Buonarruoti's fac-simile, is 16 inches long by 10 deep. Unless, indeed, he is describing the Carpegna cameo under a mistaken notion as to its quality, for his drawing tallies with that Sardonyx in dimensions and subject. Such vast pastes must have been made for panels to coffrets in metal, like the crystal plaques of the Cinque-cento.

fect imitation of an Onyx of three layers. Such counterfeits, so completed, often occur, and often are most deceptive, so exactly does their surface imitate the effect of age upon that of the Agate or the Sardonyx. Yet more puzzling must they have been when recent, for Martial alludes to the difficulty of finding a real Sardonyx at the jewellers' of his day, and the fruitless search occupying the morning of his dilettante :—

"Sardonychas veros mensa quæsivit in omni."

Amongst the sorts made in his time Pliny (xxxvi. 67) mentions the *murrhinum*, or imitation of the famous murrhine stone which these very glass counterfeits, were there no other grounds for the judgment, would teach us were the bowls in Agate with unornamented surfaces, such as India still exports. Glass *scyphi*, exactly reproducing the clouds and shades of brown and white Agate, still exist both whole and in fragments. The still more expensive *vasa onychina*, cut in Onyx concentrically stratified, and having their exterior enriched with relievi, upon the dark ground, in the white superstratum, were emulated in this cheap material and with admirable taste; in fact, these substitutes infinitely excel in point of art their prototypes in the so highly priced stone. A fine example is the elegantly shaped vase of the Museo Borbonico, entirely covered with a network of vines in a delicate white upon a dark-blue ground; both the material and the execution precisely agreeing with those of the far-famed Portland Vase.[6] Such relievi were produced by imitating the proceedings of Nature in the creation of the Onyx: the body of the vase was first moulded in the opaque dark-blue pot-metal, over which was fused a layer of opaque white, which was cut away[7] with the

[6] This vase, supposed to have contained the ashes of Alexander Severus, was discovered about the middle of the sixteenth century in a sarcophagus at the Monte di Grano, Rome. The subjects of the decorations have never been explained in a satisfactory manner; but one of the panels on the Arca Cypseli, described so fully by Pausanias, has struck me as elucidating the group where a female, seated on the ground, repels with one hand the advances of a youth, whilst a huge crested serpent rises against him from the other. In the ancient Corinthian carving, "Peleus is approaching Thetis, 'from whose hand' a serpent flies against him."

[7] A process to which refers Pliny's expression, "aliud argenti modo cælatur."

drill and the diamond-point to produce the cameo. Such a vase is the subject of the epigram (Anthol. ix. 749):—

> "Why Cupid on the cup? Enough for wine
> To inflame the heart: why fire with fire combine?"

Though perfect vases in this style are the rarest of the rare, yet fragments of such are not uncommon: all that have come under my observation display the same marvellous taste in the design and equal delicacy of finish.[8]

Glass vessels thus embellished were the "toreumata vitri" of Martial (xii. 74, xiv. 94), in whose age the word had lost, with the loss of the art, its proper meaning of a chasing in metal, and come to imply a relievo on a gem or paste; in short, our cameo. Compared with the fashionable *Murrhina*, these glasses, deriving their sole value from the engraver's hand, were of but trifling cost and fell within the means of our necessitous poet:—

> "Cheap vulgar chasings we in glass alone
> That dares to counterfeit the precious stone;
> Yet far superior to the crystal rare,
> Not boiling water flaws our substance clear."
>
> . . . . . .
>
> "See the sweet groups that on the goblet smile—
> Fruits of the taste that drinks the tepid Nile.
> Ah! whilst he strives to add another grace,
> How oft the artist spoils the finished vase."

Finger-rings formed entirely in glass are known; the shank of a twisted pattern imitates in colour the Agate; they bear a mask in relief, usually in green, representing a Plasma cameo. One fell into my hands when in Rome, recently found, which exactly corresponds with that given by Caylus (ii. pl. 89). From the fragility of the substance, perfect examples are extremely uncommon.

A singular variety of the antique paste, something between a mosaic and a cameo, is afforded by those disks, the size of ring-

[8] This was the "vitrum fabre sigillatum," deemed not unworthy to figure on the table of the wealthy Byrrhæna amongst "crystallum impunctum argentum alibi clarum et aurum fulgurans et succinum mire cavatum in capidas ut bibas . . . . gemmas formatas in pocula vini vetusti" (Apul. Met. II.).

stones, the ground imitating Lapis-lazuli, and inlaid with other pastes forming a pattern, in very low relief. I have seen only two (Herz), a vine-leaf and a parrot, which being considered unique, sold for 10*l.* each: and the former of these is engraved in one of Caylus' plates, as a marvellous example of the art.

Under this head come most appropriately the glass disks found stuck in the plaster (before it set) that closes up the tombs in the Roman catacombs. They are for the most part the bottoms of cups, of which the upper part has been completely mouldered away by age, placed with the corpse to contain the sacramental elements. Several, however, were indubitably no more than medallions to be worn for pendants by the poorer classes, who could not afford those in gold so fashionable under the Lower Empire, for they are encircled by a moulded border and having a loop attached for suspension. Within their substance they contain rude designs cut out of a stout piece of gold-leaf laid between two plates of glass, afterwards fused together and so forming one solid body. Usually the subjects are busts or full-lengths of the Saviour, or the Apostles, with appropriate legends; a few have the figure of the reigning emperor. As medallions they seem to have accompanied the interment partly as amulets to guard the repose of the dead, partly to mark the date, like the coins deposited in the sepulchres of the ages preceding.

That the Christians, however, actually used drinking-glasses adorned with religious emblems, and that at an early period of the Church, is manifest from Tertullian's apostrophe (De Penitentia): "Where is the lost sheep? let the very paintings upon your drinking-cups (calicum) come forward." But the invention of this species of decoration goes much further back, as is manifest from the exquisite portrait of a child, worthy of the best times of Roman art, now in the Townley Collection. Another figured by Millin (Gal. Myth. pl. 33) has full-lengths of three girls, Gelasia, Licoris, Comasia (whose names plainly indicate their profession), portrayed as the Graces, with the motto in Græco-Latin, "Piete Zesete multis annis,"—Drink: may you live many years.

Hadrian sent his friend Servianus as a present from Alexandria, records Vopiscus (in Vita Saturnini), two cups in *schmelze* glass,

"calices allassontes, versicolores," presented by the priest of the Serapeum (answering to the Archbishop of Alexandria of later times) as specimens of the manufacture for which his city had long been celebrated; and in truth very curious is this paste, for, though a bright green, it becomes by transmitted light a ruby red. From such a property, regarded as miraculous in the ages of barbarism that followed, a lump of schmelze lay from time immemorial upon the famous "Escrin de Charlemagne," that grand ornament of the Trésor de S. Denys, and was exhibited to the faithful as the very gem of Solomon,[9] and a fitting pendant to the illustrious Beryl with the head of the Queen of Sheba (now restored to Julia Titi) that capped that wondrous fabric of the Carlovingian goldsmith. Pliny also mentions draughtmen made of pastes of many varying tints, "pluribus modis versicolores."

These *latrunculi* are so curious both in material and in ornamentation, that they demand a separate notice before we quit the subject of antique pastes. They are disks of glass of different colours, about an inch in diameter, bearing in relief the head of a deity, or some other emblem. They exist in large numbers, a proof amongst the rest that they are the latrunculi, or men used in the very ancient game of backgammon.[1] That these men were usually made of glass appears from many passages of the classics. Ovid has the "vitreus miles," and Martial "vitreus latro." For these, as something grander, Trimalchio substitutes gold and silver coins for the two colours marking the sides:—

"Calculus ut gemino discolor hoste perit"—

his dice being made of rock-crystal. Later, luxury progressing made the men in precious stone, probably the Onyx, for Martial (xiv. 20) has—

"Insidiosorum si ludis bella latronum
Gemmeus iste tibi miles et hostis erit."

"If thou the tricky game of tables play,
Alike in gems soldier and foe survey."[2]

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[9] I have seen amongst Mr. Webb's antique glass a large paste, an intaglio head, in this remarkable variety.

[1] A name signifying in Welsh "a little battle"—a singular coincidence with the primary meaning of *latrunculus*, "a little soldier."

[2] The famous chess-board presented

Whoever desires to understand the real nature of this game, often erroneously supposed to be chess, let him read (and make out if he can) the minute account of a famous match played between the Emperor Zeno and the poet Agathias, and immortalised in an epigram of the latter's (Anthol. ix. 482).

The art of making Pastes was never lost; it afforded too great facilities to fraud of the most lucrative kind, "neque est ulla fraus vitæ lucrosior," says Pliny, ever to have fallen into disuse in the jeweller's *atelier*.[3] Pliny alludes to the numerous treatises on the subject then current. Heraclius, who wrote a manual 'De Artibus Romanorum,' flourished, as his editor Raspe thinks, in the 7th century, and appears to have been a Spanish Goth, to judge from his barbarous dialect, in which *quœrere* is used in the sense of *posse*. Amongst others, he gives a recipe for making Pastes, but has unfortunately chosen to clothe his meaning in such obscure and corrupt hexameters that a translation is altogether beyond my powers, and therefore I can only present my readers with a transcript of the original to exercise their sagacity upon:—

"*DE GEMMIS QUAS DE ROMANO VITRO FACERE QUÆRIS.*

"Sic a Romano poteris conficere vitro
Splendentes pulcros generis cujusque lapillos,
Ad modulum lapidis *cretam* tibi quippe cavabis
Hic ponas vitrum per quædam frusta minutum,
Hanc ergo facile poteris hac arte parare
Subtiliter quædam circumvolvatur arundo
Duc dum durescit cum virga fortuis hæret
Tunc ipsi virgæ superimponatur utrinque
Et circumposito teneatur virgula vitro
Atque cavo tectam penitus tunc insere cretam
Ignifit vitrum cum sit penitus liquefactum
In fossam lato fulgenti comprime ferro
Quo vesica tibi quo læsio nulla supersit."[4]

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to St. Louis by the Old Man of the Mountain is of crystal, the pieces themselves in agate: the whole on a gigantic scale worthy of its history.

[3] As a remarkable instance, J. J. Fugger notes that the famous Ruby of Charles the Bold, set in a golden rose, bought by him of the Bernese amongst the other spoils of Granson, was a false one. Its irregular unshaped figure in his cut attests its high antiquity: for Charles's own jewels were accurately shaped as *tables* or *pyramids*.

[4] A portion of this is intelligible enough: the matrix was to be made

In the crowns of the Gothic nobles discovered at Guerrazar false Emeralds and Opals may be detected amongst the real stones, evidently intended to pass for such, and particularly to replace the Emerald, which appears to have been then excessively rare in Spain, though the jeweller had abundance of the most beautiful Sapphires at his command.

But what is most strange, that masterpiece of Celtic art, the far-famed Tara Brooch, exhibits specimens of this art, in the shape of four heads in red paste, all from the same mould, set in the handle of the jewel, and clearly belonging to the same style as the rest of the ornamentation.

Antique pastes are often to be met with retaining their ancient bronze settings. The most interesting example of the class I have met with is in the Waterton Collection, and was found on the finger of a skeleton in an Etruscan tomb. The ring had been strongly gilt, and was set with a good paste, a long pointed oval, cast from an intaglio of Bacchus and Ampelus in a very archaic style. But pastes seldom appear in rings of gold; and this might have been expected, for they were the substitutes for real stones to the lowest vulgar and to slaves. Pliny mentions the glass gems from the rings of the populace, which being ground to powder produced the white paint hence called "annulare." A paste cameo, however, a seated sphinx, a good imitation of the Sardonyx, set in a massy gold ring, once came in my way: but the cameo had beyond all doubt been palmed off upon the ancient owner as a true gem, and the same may be supposed the case with the imitation of the Carbuncle, a vase, elegantly set in gold, now amongst Mr. Waterton's. Similar frauds remind us of the jocular punishment inflicted by Gallienus upon the jeweller who had thus taken in his Empress, Salonina. She having demanded that an example should be made of the at once cheat and traitor, the Emperor sentenced him to be exposed to the wild beasts in the arena. The poor wretch stripped naked was thrown in, the door of the den was raised, when out strutted a cock;

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in pipe-clay, *creta*, and covered with the glass broken small; but for what purpose was the reed introduced? When melted the paste was to be pressed with a flat iron to prevent bubbles and flaws.

and the culprit got off with the fright alone, Gallienus declaring that it was but fair that one who had deceived others should himself be made a fool of.

The finest example of an antique piece of imitative jewelry that I have ever seen was found amongst other Roman remains at Shefford, Bedfordshire, and is now in the collection of the Cambridge Antiquarian Society. It is in bronze thickly gilt, about eight inches over, and formed by three concentric circles connected by pieces radiating from the centre, and set at all the intersections with large paste Emeralds and Amethysts of beautiful colour, retaining their first polish. Its pattern is unique for a Roman fibula, but is identical with that of the head of a monster ring, once shown me, a present from the Great Mogul to an Austrian envoy some two centuries ago: the concentric circles whereof contained every gem known to the Indians except the Diamond.

The best antique Paste intaglio that ever came before me in its original mounting was one found near Rome in the spring of 1850; its subject the Town of Troy upon a skilful imitation of the banded Agate, with its antique massy bronze ring almost entire. A singular recognition of the prototype of a paste, the genuineness of which is beyond all question, once delighted myself. Amongst the Praun Gems was a paste, of Thalia seated, holding a mask on her knee. At the sale of the Uzielli Collection in 1861, I recognised its parent in a fine Sard, then deficient in the lower part, although perfect when the paste was cast from it some eighteen centuries before. In consequence of my information the gem was secured by the then owner of the original: a coincidence perhaps unknown in the history of gem-collecting.

As soon as the glyptic art revived in Italy, the makers of false stones before now set to work to reproduce intagli in their own material, and such occasionally are to be met with in the jewelry of that age, whence their date may be positively ascertained. For the most part they are coarse, far inferior to the antique, and done in blue glass to imitate the Sapphire. At the same time, if a good antique paste fell into an engraver's hands, existing specimens show that he retouched it and passed it off for a real stone.

I have seen a false Garnet representing a Bacchic Feast with several small figures in the best style, mounted, in virtue of its supposed value, in a magnificently enamelled gold ring of the times of Clement VII. But the paste most in use during the period was an opaque kind, a dull grey marbled with green and red, badly counterfeiting the Agate, but hard, taking a good impression of the matrix, and having much the look of a real stone, especially when polished. This false Agate is particularly mentioned by De Boot. But all that was done in this line was of small account until the art was taken up by the Regent Orleans, under whose patronage it rapidly attained to perfection and celebrity, its productions far excelling the best left by the ancients in this particular walk of art.

Clarac gives the following history of the Orleans Pastes; "Having engaged (1691–1715) the services of the celebrated chemist Homberg, and assisting him with his own hands in his operations, in a laboratory established within the Palais Royal, the Regent made him reproduce in glass-pastes all the gems that he himself had collected; and besides these, a large number selected from the royal cabinet. It is said that he made six complete sets of these pastes, one of which Clarac himself possessed, the bequest of M. Gosselin of the Academy. In the keeping of the latter it had been for many years, and always was regarded as one of the six original sets proceeding from the Regent's own laboratory. It had, however, been augmented by several additions; pastes probably made by Clachant and Mdlle. Falloux, who had been instructed by Homberg in the manufacture, and set up as dealers in its productions.

"These pastes of the Regent's are both in a very fine glass and in enamel, and exactly reproduce the colours of the original stones. It is evident that they were produced with the utmost carefulness; the substance is very dense, and free from flaws and air-bubbles. The intagli in it are clear, lustrous, and internally *polished*, a result extremely difficult to obtain.[5] When held up against the light the transparent kinds amongst them produce by the richness of their colours precisely the effect of real stones.

[5] And which indeed no pastes of any other fabrique ever exhibit.

Some of them indeed, particularly the *Sardoine* (brown Sard), have been imitated better subsequently, so far as the tone of the colour is concerned, but nevertheless, in spite of the modern improvements in the art of glass-making and enamels, and in spite of the advance of chemistry, it is very doubtful if better pastes than those of the Regent could be produced in our times."

The new process rapidly diffused itself throughout Europe; and when Goethe visited Rome in the last quarter of the century, he found the making of such pastes a favourite occupation of the dilettanti residing there. Even at the present day the Romans display extraordinary skill in the art: I have seen some of their pastes, especially of the opaque sort like the Sardonyx, that could only be distinguished from the true gem by the file. To baffle this mode of detection, the ingenious device is resorted to of backing the paste with a slice of a stone of the same colour. When set in a ring the junction is concealed, and the back withstanding the test of the file enables the composite to pass muster for a real gem, adorned with a precious engraving.[6] The same method has been long, and still is, largely adopted for counterfeiting the coloured precious stones, the Ruby, the Sapphire, and the Emerald. A paste of the proper colour, backed by a piece of crystal facetted so as to impart the requisite brilliancy, is palmed off upon the unwary for a gem of the first class, nor is the fraud suspected until the wear of some months begins to tell upon the surface of the upper vitreous layer. Pliny mentions a similar trick as practised by the lapidaries of his day in the case of the Sardonyx, its three several strata being made up out of three different stones, each of the best colour for its position, and the whole cemented together with Venice turpentine,[7] still preferred for the purpose on account of its perfect transparency.

Wedgwood's seals and camei close the series of modern pastes:

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[6] As an instance Clarac mentions having been shown a paste taken from a gem of Marchant's, and actually retaining his usual signature, which had thus been metamorphosed into an antique Sard. With satisfactory vouchers that it had just been dug up at Otranto, it was sold at an enormous price to a Neapolitan duke, an enthusiastic but not experienced amateur.

[7] He is speaking of the Jaspis terebinthizusa, and, not seeing that the Greeks so called this species on account of its colour (our Amber Sard), he applies the term to the cement, and declares it erroneous in this case.

but in their material they differ from all before described, being not glass but porcelain. This substance is far superior to paste in hardness, even striking fire with the steel. There are two kinds, one imitating black Jasper, the other Lapis-lazuli. Their subjects are cast from antique originals, their impressions are remarkably sharp and clear, although wanting the polish of the Italian glass-pastes. It is therefore impossible to mistake them for true gems, although they rival the hardness and durability of the latter. But his chief excellence lies in his camei, many of which are from Flaxman's designs: others are reduced copies of the antique. The figures stand out in opaque white upon a blue ground, of a charming shade, which the numerous imitations now-a-days in the market are totally unable to reproduce. In his genuine works it will be discovered that all the reliefs have been elaborately worked over with the wheel, thus imitating the antique mode of proceeding in their best camei in paste. The finest specimen of such, the Portland Vase, he copied with extraordinary success, though somewhat failing in the dark-blue of the ground. Of this he produced fifty facsimiles, at fifty guineas each; a price, however, that did not cover the expense of the workmanship, so great an amount of skilled labour did it en gross. His other camei appear in as many varieties as their ancient prototypes: some in the form of small medallions for setting in brooches or bracelets; others decorating the exterior of vases and tea-services; and a third kind, the most important, large plaques for hanging up as pictures. Imitations of all the above are now brought out to a vast extent; but they are miserable parodies upon Wedgwood's originals, manufactured merely to sell, after the fashion of our days, the ground a cold pale blue: the reliefs, full of cracks and flaws, are merely stuck on, without any attempt at a finishing polish.

I shall conclude this notice with an observation which will be extremely unpalatable to most amateurs; that, amongst the myriads of pastes that pass current as antique, hardly one in a hundred is really genuine. This opinion is based upon the following grounds, suggested to me by experience: in the handfuls of gems perpetually brought in for sale to the Roman *antiquari* by the peasants, just as they find them in turning over

the ground of their vineyards and gardens on the ancient site of the city, pastes hardly ever occur without some portion of the original bronze ring adhering to them: the *loose* gems being invariably stones which from their base quality and careless execution had evidently belonged to the poorest class. Besides, as these valueless imitations were never worn by people who could afford rings of gold or even of silver, there is no room for the saving clause that they might have been drawn from their settings and thrown away, as was evidently the case with real gems when in barbarous times the jewels they adorned were melted down for the sake of the metal. Again, whoever has seen a paste in its original setting must be aware of the impossibility of extracting it without breakage. Had paste intagli been as common in Roman times as they are in dealers' cabinets, they would have formed the majority of the gems turned up in the soil covering ancient towns, whereas the direct contrary is the case. All pastes, therefore, that appear never to have had an ancient setting, ought to be regarded with the utmost suspicion.

The abundance of pastes, all passing for antiques, on the accumulation of which so many amateurs pride themselves, is perfectly amazing, and reads an amusing commentary upon Ovid's dictum—

"In quod volumus credula turba sumus."

Many dilettanti (like old Herz, for example, in his multifarious collection) exhibit them by hundreds at one and the same time, and must therefore cherish the belief, to support their authenticity, that the old vitrarii spent their lives in producing these imitations merely for the purpose of sowing them broadcast in the earth to turn up again for the delectation of future ages. The rate at which they are sold depends entirely now upon the credit of the cabinet to which they may belong: sometimes I have known them go for two or three shillings per dozen, and good examples in their way. It was therefore a diverting proof of the influence of a name in this department, as in all things else, to behold, at the sale of the collection above alluded to, the credulous *cognoscenti* (ill-named) bidding high, often at the rate of pounds, for utterly worthless pastes pur-

chased by the astute diamond-merchant their collector, not long previously, for as many pence.

To account for their abundance, it must be borne in mind that for three centuries the Italians were largely manufacturing these articles, their material being the hard glass then made, and their moulds coarse, as their false Agates plainly show; it is therefore hard to perceive how their fabrications can be discerned from the ancient, being produced under conditions so similar.

As for the fine specimens which began to appear after Homberg had so greatly improved the process, their polish and their softness forbid their entering at all into the question. And under the same head may be classed all that followed; even the amateurs, whom Goethe speaks of, having made themselves masters of the technical processes when once invented, so as to be able to bring out pastes free from bubbles, and exhibiting a clear impression of the matrix. Modern pastes have one almost certain mark of their origin, when they retain at the back the thin projecting rim of glass formed by the portion superfluous and overlapping the circumference of the casting-box, a convincing proof they were never set at all, or even intended for a setting; and such ought to be put down to the account of the amateur glass workers of the last century.

An interesting lot of the raw stock in trade of some old *vitriarius* once came under my examination. It amounted to above two hundred masses of glass, in form and size resembling gooseberries of different kinds: a shape given them, as it was to the blanks in the contemporary coinage, to enable them, when semifused, better to take the impression of the mould. Some were of fine colour, others ingeniously divided by an opaque band intended in their finished state to imitate banded Agates. The whole stock, including a remarkably fine bust of Jupiter in relief, of green paste, and a few rudely engraved Sards and Garnets, was said to have been found in one deposit in the vicinity of Naples. Could this account be depended upon, such a collection of the raw material would have greatly illustrated the process used in this curious art: but unfortunately no reliance whatever is to be placed upon the tale of the *provenance* of any antiques brought

from that country, however well authenticated it may appear to the inexperienced. But a long time back an instance beyond all suspicion came under my observation, of a paste prepared for the matrix. It was of a dark, translucent blue, lenticular in shape, and found together with a carnelian ring-stone, not engraved, and a silver ring set with a red Jasper bearing a rude intaglio, all deposited under a large stone amongst some ruins of the ancient Isca Silurum.

This single relic supplies in itself a reason for believing that the art of making paste intagli was then carried on in Britain, as we know was the case with that of bead-making, and corroborates the opinion expressed by Wright (in his 'Celt, Roman, and Saxon') that the rolled lumps of beautifully coloured glass found in the shingle on the Brighton beach are the relics of some Roman-British manufactory once occupying the site, and are not all indiscriminately to be accounted the mere harvest of the lapidaries who annually sow the sands with broken bottles for such lucrative returns.

The ancient process of glass-making was simple in the extreme, and the result of a lucky accident. Some Phœnician traders, returning from Egypt with a ship-load of natron, native soda, the soap of the ancients, chanced to land at the mouth of the river Belus, close to the city of Ptolemais in Palestine; and not being able to find any stones on that sandy and muddy beach to prop up their caldron over the fire, they used for the purpose some lumps of natron out of the ship. Afterwards finding, in the ashes of their fire, streams of a novel and shining substance, they repeated the experiment, and so discovered the components of glass. For many ages this strip of the coast, not more than half a mile in extent, supplied the world with sand for this manufacture; but in Pliny's age it had been discovered that the sand from the mouth of the Volturnus (Neapolitan) was equally good. Sidon was the seat of the manufacture for a long period. Alexandria succeeded for works of the more artistic kind,[8] and main-

[8] Here was invented the most elegant and durable representative of value ever devised, the glass money issued by the Fatimite sultans dating from the 10th century. It consists of thick disks of green glass, bearing a legend in letters raised in red enamel.

tained its reputation long down into the Middle Ages, producing such remarkable enamelled pieces as the Cup of Charlemagne,[9] so long treasured up in the Madeleine, Châteaudun. It sounds oddly to a modern ear to find Pliny alleging, as a proof of the proficiency of the Sidonian workers, that they actually made *mirrors* in glass; but in his time, and long after, *speculum* metal, a particular alloy of bronze, was considered the only fit material for the purpose; and even in the 15th century the Italians preferred mirrors in polished steel, an example of which exists in the famous one of Lucrezia Borgia in the Soulages Collection. One Sidonian artist at least has contrived to perpetuate his name, for many handles of vases are known stamped ARTAS. SIDON., and the same repeated in Greek.

In the old method they employed, besides the sand of the Belus, "white pebbles" (quartz) pounded, with a proportion of copper, and melted the mixture with a fire of dry resinous wood.[1] But later they had learnt to whiten their glass with the mineral *magnes*, evidently our manganese, "magnesia vitriariorum." The first melting was called *ammonitrum*, from its ingredients—sand and one-third of *natron*: this was melted again and purified before being worked into vases. The substance was elaborated in a variety of ways, "some being fashioned by blowing, some polished on the lathe, others engraved after the manner of silver-plate." Glass, remarks Pliny, had superseded gold in the form of drinking-vessels at the tables of the great; but the gain in point of economy was but little, since these were manufactured with such elegance that Nero gave six sestertia (60*l.*) for a pair of small two-handled vases ("pterotæ"), doubtless belonging to the same class of artistic productions as the Portland and similar rarities already noticed.

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[9] In reality made towards the end of the 12th century, as the fine inscription covering its surface announces. The same city was the source of the Venetian manufacture: the earliest glasses of that fabrique, which go back as far as 1490, are gilt and enamelled in precisely the same style. (See J. C. Robinson's Memoir on Venetian Glass in the Soulages Collection.)

[1] "*Continuis* fornacibus sicut æra," in a succession of furnaces like copper, without being allowed to cool; or it may be in a reverberatory furnace like that now used in copper-smelting, for in his notice of *cadmea* he mentions the *camara* as well as the *latera* of the furnace, showing that it was an arched one.

If there be any truth in a strange story alluded to by Pliny, as "more famous than well authenticated," a secret had been once discovered in the art which there is small likelihood will ever be regained. "It is said that in the time of Tiberius was found out a way of tempering glass so as to make it malleable, but that the inventor's entire establishment was exterminated, for fear the value of bronze, silver, and gold should suffer diminution in consequence." It must be remembered that Pliny was born under this emperor, and would not have alluded to the report had it not been a matter of public notoriety. Petronius, Pliny's senior by some twenty years, makes his Trimalchio, an amateur in virtue of his wealth, give a humorous version of the same tale:—"I prefer glasses; others do not. If glasses were not so brittle, I would rather them than gold; as it is, they are of little value. Yet there was once an artist who made a glass that would not break. He was admitted before the emperor with his present. After the latter had admired it, he requested Cæsar to give it him back again, and then dashed it upon the pavement. The emperor could not help being frightened almost out of his wits; but my man picks up the bowl from the ground, and lo! it was only bruised, just as if it had been of brass. Thereupon he takes out a little hammer, and leisurely makes it all right again. Having done this, he thought himself already at the summit of his wishes, especially when the emperor asked him, 'Does any one else know of this mode of tempering glass?' Now mark me. As soon as he had answered 'No,' the emperor ordered him to be beheaded then and there; for if his invention had become general we should look upon gold as so much clay." There may be something at the bottom of the legend, and it may be explained by supposing the substance not a true glass, but some composition representing the coloured kind in which the Roman scyphi were usually made. A ring found in a mummy-case once came under my examination, exactly resembling amber-coloured glass, but which was as flexible as indian-rubber, being probably moulded in some resinous composition. Now a bowl in a similar substance would exactly resemble glass, and yet be as flexible as the softest metal, even as thin pewter. Supposing such a counterfeit to have been passed off upon Tiberius for a

new discovery in glass-making, the inventor's recompense for the trick, when detected, would have been sharp and summary, his patron not being one to let off an offender so easily as did the jocular Gallienus. Moreover, a few years ago there was exhumed from a tumulus in Ireland a perfectly preserved bowl in Amber, of so large diameter that it was considered impossible it could have been hollowed out of a single block. It was ascertained at the time, by the ingenious discoverer of the relic, that bits of Amber boiled in turpentine can be easily reduced to a plastic mass, can be kneaded together, and moulded into a consistent whole; and this was supposed the true method by which this gigantic scyphus had been elaborated. Under "Succinum" will be found some ancient recipes for the purifying of Amber, and also for the staining it to imitate certain precious stones. This shows that the Roman lapidaries were fond of experimentalizing upon the capabilities of this singular mineral. In the description of Byrrhæna's feast, above quoted, *capides* hollowed out of Amber make a conspicuous figure. The Romans could scarcely have afforded solid pieces for the formation of cups, however small, although their value was enhanced by representing them to have been so formed.

The ancients, though such proficients in the making ornamental glass, and in their manipulation of the paste,[2] probably had no secrets not possessed by the modern trade, except those unattainable now, superior skill and taste. The same reasons account for their achievements in the glyptic art, although, if any faith were to be placed in the strange recipes which Heraclius pretends to have preserved, they had found out *compendia* for annihilating every difficulty; but that barbarous writer was like the rest of the Mediæval philosophers, who had by their education lost all power of distinguishing truth from falsehood; and having determined, from fancied and fanciful analogies, that certain means ought to produce a certain result, they, proceeding according to a woman's logic, incontinently set down such means as actually

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[2] Caylus notices that the Parisian trade were particularly struck in the case of certain Roman urns at their being made without the *ponty*, or mark of the adhesion of the blowing-tube.

effecting the object desired. But his recipes are in themselves so curious that I shall transcribe a few of the most remarkable, although strongly disposed to consider all as little better than the dreams of some monkish artist too lazy to try the experiment of their truth. In the frequent introduction of earth-worms into his *menstrua*, there may lurk some reminiscence of Solomon's worm *Samir*, whose blood dissolved all gems—that fable of the wooden-headed Rabbis, engendered upon the employment of the *smyr* (emery) by the practical Greeks.

HERACLIUS ON SOFTENING GEMS.

The notion entertained by many, and which involuntarily forces itself upon the mind on examining the facile execution of many of their works, viz. that some secret for softening the gems beforehand was known to the ancients, derives some confirmation from the following recipes of Heraclius, who wrote at a period (the 7th century) when the traditionary processes were still kept up, though in a faint and feeble existence. If we could believe his positive assertion in his prelude, that he had himself tested all his recipes,

"Nil tibi scribo quidem quod non prius ipse probassem,"

the whole mystery would be solved at once; but his promises are so extravagant as to make one suspect that, instead of disclosing ancient trade-secrets, he is merely passing off for such chimerical theories of his own, after the common manner of Mediæval quacks.

Extracts from a MS. of the 13th century, in the Library of Trin. Coll., Cambridge, published in Raspe's Treatise on Oil-Painting.

"*Of engraving upon Glass.*—Ye artists who wish to engrave glass handsomely, now will I disclose to you a method exactly as I myself have proved it. I collected fat earth-worms turned up by the plough out of the ground; and at the same time *the art* useful for such matters directed me to get vinegar, and the hot blood out of a big he-goat: which I skilfully fed upon strengthening herbs for a short time, when kept tied up in-doors. With the hot blood I then mixed the worms and the vinegar, and so

anointed the whole of the bright shining bowl; which being done, I essayed to engrave upon the glass with the hard stone known by the name of Pyrites.

"*Of the engraving in Precious Stones.*—Whoso desires to attack with the steel the noble gems which the princes of the Roman city, they who formerly occupied her lofty palaces, loved far above gold, let him receive, for it is extremely precious, a device which I have discovered by deep thought. I got myself uricia (urina?), and also blood from a big he-got, fed upon grass for a moderate time: which being done, with the *hot blood*[3] I engraved the gems, according as the author Pliny directs, and——

"*How Stones are engraved.*—Take a he-goat that has never paired, and put him in a cask for three days. Afterwards you must kill or bleed the goat, and mix his blood with his urine, and so steep the stone in it for one night; and afterwards either press it into a shape, or carve it as you please. In order to make it beautiful (*i. e.* to polish it) make yourself a plate of lead, and sprinkle this with white flint ground small like pepper, and rub the stone upon it until you have smoothed down its roughness. Then tie up some of the same pounded flint in a woollen cloth, and rub therewith the corners you were unable to get at with the leaden plate. Then that the stone may recover its original lustre, get walnut-oil, and rub it therewith. Furthermore you must rub it with a waxed cloth, so that it may shine, and cease sweating.

"*How Crystal may be engraved.*—Take crystal and wrap it up in a linen cloth steeped in the sweat of a she-goat, and then cover it up with the cloth itself in cow-dung, and so cut it with a knife as you may wish, but yet with caution. After you have done, throw it into cold water. Lastly rub it on a plate of lead with flour or bran.

"*How Glass is engraved.*—The teats of a she-goat are flogged with a stinging nettle, and pressed with the palms of the hands so that the milk may come down in them. Afterwards the milk

[3] Calefacto sanguine probably should be calefactus sanguine, heated or boiled in the blood.

is pressed out into a vessel, and in it let the glass be placed for one night, together with the steel tool by which it must be engraved. But when it is required to be used, let it be warmed again to the same degree of heat it had when it was first milked, and let the glass be always heated in it: and so it may be cut. In the same manner may other stones" ——.

His directions for cutting crystal are so obscure that it will be more advisable to give them in the original than to attempt a translation, at the risk of substituting my own ideas for his:—

"*QUOMODO CRISTALLUM POSSIT SECARI.*

"Cristallum facile tali valet arte secari:
Opportuna tibi quæratur lamina ferri,
Huic etiam binæ claves jungantur utrimque
Ex ferro, medium quæ firmant undique plumbum;
Nam plumbo solo tribuetur cura secandi.
Ipsæ custodes laminæ sint exteriores
Ut tibi dent rectum recto conamine cursum.
Sed nec duritiem poteris prorumpere tantam
Mollitie plumbi nec (nisi?) quiddam junxeris illi—
Tanquam pulverulas fornacis fragmine micas
Contere, quas teneræ poteris connectere lamnæ;
Hæc etenim plumbum conjunctio reddit acutum
Et quum (suum) rursus habent lateris fragmenta vigorem—
Sed vim cristalli cruor antea temperet hirci."

The sense seems this: to strengthen a plate of lead with two parallel bars of iron, which serve as a guide to the hand in rubbing the crystal; and to give the lead a cutting surface, sprinkle it with powdered potsherds,[4] which get fixed in it by the pressure of the crystal upon them, just as in making watch-jewels at present the coarse diamond-powder, the *Bort*, is fixed upon the surface of a leaden disk by a few blows of a hammer before it is set agoing.

PASTE GEMS.

Although the Roman imitations of the precious stones—in two at least, the Emerald and the Lapis-lazuli—were truly admirable,

[4] Perhaps meaning the same substance as Pliny's "ostracias, testacea durior," used for cutting other stones. It was the same as the cadmitis. Now the latter seems to mean some kind of copper-slag.

yet in all the other kinds, except as to hardness, they are far outdone by the modern Parisians. I transcribe from Barbot's 'Traité des Pierres Précieuses' the ingredients and proportions for making the most important species (article *Strass*):—

Strass, ordinary.	
Litharge	5·0
White sand	5·75
Potass	0·5

Sapphire.	
White strass	250·0
Oxide of cobalt	3·74

Emerald.	
Strass	250·00
Copper, green oxide	2·51
Chrome, oxide	0·11

Beryl.	
Strass	187·50
Antimony, glass	1·32
Cobalt, oxide	0·082

Topaze.	
Ceruse of Clichy	50·0
Quartz pebbles calcined	50·0

Sapphire (another).	
White strass	31·25
Cobalt oxide	0·11

Another.	
Strass	500·00
Copper, acetate	5·9
Iron, tetroxide	0·825

Garnet, Suriam.	
Strass	27·75
Antimony, glass	13·95
Purple Cassius	0·110
Manganese oxide	0·110

Strass, so called from the German chemist who invented it, is the brilliant White Paste, the material of Paste Diamonds. It will be seen that, coloured by different metallic oxides, it reproduces the other gems. Barbot gives several recipes for its composition; but they have, as far as the Diamond is concerned, been superseded by a quite recent discovery of the ingenious Parisian chemists. By a mixture of borax (as yet a secret) a paste, the "diamant de bore," is produced as hard as quartz, defying the file, and when set in real gold (as such now are) not to be distinguished by the most practised eye from true brilliants.

ENAMELS.

Enamels, though the same in composition as pastes, differ in the mode of application. The vitreous mass is ground fine, and then, mixed with gum-water, is applied with a brush to the sur

face to be ornamented, upon which it is finally fixed by means of fusion. From the degree of heat necessary in the operation, the substratum must be either fine gold or pure copper, capable of resisting it, otherwise the fine compartments formed in the metal to contain the enamel would run, and the outlines of the pattern be deranged. The basis of all ancient enamels, for which Mediæval writers give many recipes, is powdered glass or flint, oxide of lead, and borax, mixed in various proportions, and coloured by different metallic oxides. It was a Celtic invention, made to replace the Λιθοκόλλητα, or inlaid gem-work of the Orientals, by a cheap and attainable imitation in the baser materials of glass and copper. This we learn from a passage in that pretty piece of Philostratus, the *Imagines*, or 'Picture Gallery,' where he is describing the Boar-hunt (xxvii.):—"The horses have gilt bits, and their head-ornaments are likewise gilt and diversified with colours. These colours, it is said, the barbarous nations (of the West) dwelling upon the ocean pour into the copper when red-hot, so that they become like a stone when congealed, and retain the position traced out for them." An ambiguous account of the process, which shows how little was known about it in Rome at the time he wrote, the reign of Severus. But in Britain the art had been carried to perfection by this time, as is attested by the remarkable incense-burner—its surface covered with a tasteful floriation in red and blue—found with the other relics in the tomb-vault of one of the Bartlow hills. Abundance of fibulæ, similarly decorated and of British origin, are to be seen in collections. All these are done by the *champ-levé* process: that is, the patterns have been cut out to a considerable depth in the metal, and these beds filled up with the fused enamel, afterwards polished down to a smooth face. Such was the mode in use throughout the Middle Ages, as the innumerable reliquaries, coffrets, and tablets of French and German manufacture, sufficiently testify. But the Byzantine jewellers took it up and applied it to gold, inventing the *cloisonné* method, more exactly imitating the old λιθοκόλλητα, each colour being contained in its distinct compartment of thin gold-plate set on edge upon and soldered down to a stouter basis, the thin lines of the gold serving as the outlines of the whole design, which is often a

singularly complicated piece. This Byzantine art was taken up by the Persians in the East, as the wonderful cup of Chosroes, in the Bibliothèque Impériale, remains to declare, and by the Anglo-Saxons in the West. The beautiful jewel made by order of King Alfred manifests their proficiency in the art; and several other examples of Saxon skill in cloisonné enamelling ornament our collections.

The third and modern manner of enamelling upon a smooth surface came later into use, in the 15th century, being merely an adaptation to copper of the Moresco invention of painting with enamel colours upon a ground of stanniferous glaze laid over earthenware, which the Italians of those times were carrying out with so much success in their majolica. In this last development the vitreous glaze was merely laid on like water-colours upon the polished copper, with no longer any bed traced to direct it, the skilful application of the fire alone preventing the several colours from flowing, when fused, out of their proper positions. Of this style the best types are the pieces of Limoges work, now so much sought after, specimens of which appear soon after 1450, that is contemporaneously with the beginning of the majolica manufacture in Italy; but the art only attained perfection in the middle of the next century, when the paintings of the Rémonds display art as fine as that of their Italian rivals in the other branch of glaze ornamentation. Some nicely-finished paintings in this style may be found adorning jewels of the Cinque-cento; but it was not before the age of Louis XIV. that the French, the great masters in this art, headed by the inimitable Petitot, produced miniatures as exquisitely finished and as spirited as the best paintings upon ivory.

This also is the method employed by the Chinese. It seems at variance with the history of that race to suppose they learnt the art from the Europeans. In fact they have applied it to works on a much larger scale than were ever attempted elsewhere. We have in this country tall ewers, capacious basins, elaborate vases, perfectly painted with enamels of the most vivid colours, and possessing this superiority over European enamels, that they are not injured by the contact of boiling water.

CUP OF CHOSROES I.

The sole relic of the splendour of the greatest of the Sassanidæ, the Nourshirwan the Just, so famed in modern Persian poetry, is the Cup of Chosroes I., now deposited in the Bibliothèque Impériale, Paris. For more than ten centuries had it been preserved in the treasury of the Abbey of St. Denys, to which it had been presented by Charles the Bald, and long held in the highest veneration as the cup of King Solomon, "whose figure (according to Dom Felibien), drawn after the life, seated upon his throne, with steps adorned with lions on each side, as Holy Scripture represents him, appeared cut in relief upon a very excellent and large white Sapphire set in the bottom. Also was it enriched around the brim with Jacinths, and inside with very fine Garnets and very fine Emeralds." Thus its value as a Scriptural relic was enhanced by the supposed inestimable worth of the precious stones enclosed within its circumference. But, alas! these gems, subjected to the severity of modern criticism, prove to be but pastes and crystals, and the ownership has been transferred from Solomon to a monarch later by fifteen centuries, though equally renowned for his wisdom amongst the Orientals. In the signal defeat of the ambitious Shah by Justinian, the general of Tiberius Constantine, on the plain of Melitene, when "a Scythian chief who commanded their (Roman) right wing, suddenly turned the flank of the enemy, attacked their rear-guard in the presence of Chosroes, penetrated to the midst of the camp, pillaged the royal tent, profaned the eternal fire, loaded a train of camels with the spoils of Asia, cut his way through the Persian host, and returned with songs of victory to his friends" (Gibbon, ch. xlvi.), this, the drinking-cup of the king of kings himself, may with the greatest probability be assumed to have formed a part, and the most signal trophy of the Roman success. In the constant interchange of friendly offices between the Byzantine and Frankish courts, it may easily have found its way to France within the ensuing two centuries, before the time when Charles the Bald appears as its possessor. To abridge the accurate description, by Chabouillet, of this unique specimen of the art of the gold-

smith, glass-worker, and gem-engraver of the 6th century, "This transparent cup is composed of a sort of frame in massy gold, and of three circular rows of eighteen medallions in rock-crystal and coloured glass,[1] serving as a frame to the principal subject, a round medallion of rock-crystal, filling the bottom or 'umbril' of the bowl. This is engraved in relief, but set with the plane surface inwards, and represents Chosroes I. seated upon a throne, the supports of which are winged horses. At the back of the throne is a large cushion, but thrown to the right by an error in the perspective, not to be wondered at in a work of this date. The monarch is crowned with a globular turban, surrounded by battlements and surmounted by a crescent, over which appears a second crescent supporting an orb, whence depend two streamers. By the form of the crown we identify this portrait as designed for Chosroes I., for it exactly coincides with that worn by him upon his gold piece in the Blacas Cabinet; and it is a rule that each Sassanian king modified the form of his head-dress, and the attributes decorating this venerated mark of sovereignty, upon his coinage. The monarch is shown in front-face; his hair, divided in two huge curly clusters, falls upon his shoulders; his beard, thick but short, and not curled. He is clothed in an embroidered robe or *candys*, and rests both his hands upon the pommel of his sword in its scabbard. From his shoulders float two large streamers, like those of the turban, and two still larger from his bust, floating away towards the left, and two more from his feet. Both the border of the bowl and the frame of the large medallion are inlaid with cubes of glass imitating Garnets. The medallions of the rows above mentioned are alternately white and violet: the former in rock-crystal, engraved on the outsides with a flower in relief; the latter in glass, cast with a similar ornament. The interstices between the me-

[1] In imitation of the more precious materials similarly employed in goblets of the Early Empire. "Nor did these suffice (the Myrrhine and Crystal), we drink out of an assemblage of gems, and weave cups out of emeralds, and exult to hold India in our hand for the purpose of intoxication, whilst gold is a mere accessary," which last evidently alludes to the mere skeleton frame-work holding the gems together.

dallions are filled up with lozenge-shaped pieces of glass of a transparent green. Dimensions of the bowl, 28 cent. wide by 35 deep (or about 11¼ inches by 14)."

The traditional celebrity of this splendid goblet, the pride of the most illustrious of their ancient sovereigns, may well be supposed to have furnished Oriental story-tellers with the legend of King Jamshid's famed Ruby Cup, of which Hafiz sings:—

> "My wanderings brought me to the fast-closed niche
> Where Jamshid's cup of sculptured Ruby lay;
> Blushed through the porphyry wall its radiance rich,
> As through the curtains peeps the rising day."

> "Earth and earth's gifts were graven on its round,
> Her cities, nations, of all tongues and kin,
> The various treasures in her bosom found;
> And words of power the buried wealth to win."

APPENDIX.

ORPHEUS ON GEMS.

A GIFT to mortals from protecting Jove,
The son of Maia brings me from above,
By Jove's command, to teach to all below
A sure remede against each earthly woe.
Hear it with joy! this to the wise I say,
Whose heart is right, and who the gods obey;
For the profane, in their own folly blind,
Heaven suffers not this remedy to find.
Rejoicing in this boon in times of yore,
Phœbus his son up to the immortals bore,
And led the healing god to where on high
Olympus rears his snows amid the sky.
Where, too, the Athenian goddess, Pallas chaste,
Alcides, saviour of the nations placed.
Taught by such lore, great Chiron scaled the walls
Of lofty heaven, and burst into its halls.
All these, of demi-gods the first and best,
Joyous received the mansions of the blest;
But us, the god who bears the golden wand,
To dwell in peace contented doth command;
Enjoying wealth, in its possession sure,
Through his kind care, from every ill secure.—
Whatever mortal his bold heart impels
To seek the mystic cave where Hermes dwells,
That mystic cave where the wise god a hoard
Of all things good hath in his treasure stored,
He shall return, and bear in both his hands
A heap of blessings numerous as the sands:
No care, no sorrow shall he ever taste,
Nor pining sickness his strong body waste;
Nor, dreading his foes' might, from battle flee,
Abandoning the hope of victory:

Nor in the games when he disputes the prize
Shall e'er opponents dare 'gainst *him* to rise ;
Though limbs of brass, though souls of iron they bring,
All burning for the crown, into the ring;
By mountain herds as the dread lion feared,
And by his fellows as a god revered ;
In regal courts he honour shall command,
And 'mid the people of each foreign land.
Him lovely youths with all their tender charms
Shall seek to clasp within their longing arms;
And the soft maid, by love's strong impulse led,
Shall gently draw towards the golden bed ;
His prayers shall ever reach the Immortals' ear,
Nor angry seas nor tempests shall he fear;
But tread with feet unwetted o'er the sea:
Him, though alone, shall savage robbers flee.
In him his servants shall a father view,
And love their master's house with reverence due ;
He shall at will the hidden thoughts perceive,
Which others in their inmost hearts conceive;
And what the birds, the inmates of the sky,
Amongst themselves, unknown to mortals cry;
Those winged interpreters of heaven's decrees,
Aye chanting forth their mystic melodies.
He learns the dragon's rushing force to break,
And quench the venom of the crawling snake;
The man dashed to the ground in that dire hour
When reels his brain 'neath Luna's baleful power,
I'll teach his cure, and how the pest to tame,
That from the elephant derives its name;
And how to ban by spells the dead man's ghost,
Sent back to day from Pluto's gloomy coast.
A thousand other blessings heaped on high,
Stored in the cave of skilful Hermes lie ;
Immortal, true, of wondrous potency,
Who so attains a happy man is he !
The guardian god who Argus slew of yore,
Hath me ordained to teach this mystic lore,
And from my breast, which he himself constrains,
Pour forth his precepts in multifluous strains.—
But small their number they who seek to learn;
Presumptuous mortals ancient wisdom spurn,

If from afar bright Virtue to them cries,
(Mother of heroes) they her call despise:
All fly like cowards, in hot haste they run,
All, labour, life-preserving labour, shun;
No happiness upon their dwellings shines,
No heart to serve th' immortal gods inclines;
But like to brutes senseless, untaught, they lie,
No heaven-born wisdom doth their need supply:
Nor seek they refuge in the god of light,
Nor pray his holy aid to heal their plight;
No glorious deeds the grovelling wretches know,
To cast a lustre on their state of woe;
Their souls enveloped in her thickest clouds,
Impenetrable Darkness ever shrouds
With envious hindrance, lest their steps proceed
To tread the paths of Virtue's flowery mead;
But *her* the wretches from their cities chase,
And scorn the helper of the human race.
Partner with heroes in their high emprize,
A cruel death the poet-prophet dies;
And hated is the man, and fear'd by all,
Whom people by the name *magician* call:
The god-like seer beneath the sword unjust,
His head struck off, lies out-stretch'd in the dust.—
But I to those who my behests obey,
Will treasure far above all gold convey:
A man I seek endowed with patient mind,
And full of zeal, to toil with me inclined;
Eager to learn, and willing to be taught,
For all success must be with labour bought.
To words or deeds that no hard labour own,
High-thundering Jove ne'er grants the victor's crown.
With grievous toil yoked to his fiery car,
His steeds bear Phœbus through the fields of air,
And all exhausted by his upward way,
Glad to his Western goal conduct the Day.—
Far better, converse with the wise to hold,
Than countless treasures of all-powerful gold;
One morn as towards the fields (an annual rite)
I bore my offerings to the god of light
I met Theodamas, that seer renowned,
Home to the city from the country bound.

I grasp his hand, and thus the sage address:—
"Tarry to-day, if no great business press,
To-morrow to the city wend thy way;
Now, celebrate with me the festal day.
To meet like this sure heav'n hath been thy guide,
Therefore my friend to follow me decide;
And with me to the sacred rites repair,
Which virtuous men with holy hands prepare;
It specially the powers divine delights,
When good men celebrate their sacred rites.
No distant journey, for thou see'st me bound
On my own land towards yon rising mound
Where once in childhood I had strayed alone
In search of quails which from my charge had flown:
As I approached, each playful favourite tame
Stopped when I called it by its well-known name;
But as I stretched my hand the prize to clasp,
The wanton vanished from my eager grasp;
In my hot haste I tumble on my face,
But up again, and still pursue the chase.
But as they reach the summit of the hill
The startled fowls send forth a piping shrill,
And swifter than a dart or arrow's flight
Upon a lofty beech the pair alight.
For they had marked in time a deadly snake,
With open jaws forth issuing from the brake,
Unseen approaching by my careless eyes,
Fixed too intently on my longed-for prize.
At last I mark him raising from the ground,
His head prepared to strike the deadly wound;
Whoever then had viewed my mad career,
As down the slope I dashed in panic fear,
Had sure not deemed me of my quails in chase,
Nor boyish, limbs that drove so wild a pace;
An eagle's wings my terror would demand,
Or swiftest winds: grim death was close at hand.
Full often as the breeze them backwards bore,
His pointed fangs my floating garments tore;
And sure, before my fated period came,
The monster had devoured my tender frame
Had not I sprung upon an altar hoar,
Raised to bright Phœbus in the days of yore,

Where lay, spared by the flames that round had sunk,
The half-burnt fragment of an olive's trunk:
I grasp the massy weapon as it lay,
Face my pursuer, and so stand at bay;
Spying resistance he with fury burns,
And in thick wreaths his supple body turns;
His scaly volumes, bright as polished steel,
Fold upon fold are piled in many a wheel;
His glistening fangs above the altar rise,
His horrid hissings drown my feeble cries:
With all my force full on his head I struck,
The half-burnt club in thousand shivers broke;
But yet, for favouring fate did not ordain,
That I should sink by this fell monster slain,
Two sturdy hounds, that watched my father's flocks,
Spread o'er the plain whence rise yon towering rocks:
They hear my voice, and to my rescue come,
For I had oft caressed them at my home.
On *them* he turned; I leaping to the ground
In hasty flight a place of refuge found:
As 'scaped the eagle's talons in mid-air,
'Midst tangled thickets lurks the frightened hare,
So mingling with the flocks I crouched beneath,
And 'mid their numbers shunned the glance of death.
Whilst my good father lived, he year by year
Up to the guardian altar brought a steer,
An offering to the Sun, of grateful joy,
To pay the ransom of his rescued boy;
So now the choicest of the herd I bring,
A fatted calf, the firstling of the spring;
And mount the hill, steep rising from the plain,
In due procession with a friendly train;
The trusty hounds that slew the crested snake,
A willing part in the procession take.
Around the altar of the king of light,
A thousand charms arise in beauty bright:
A verdant plain, with herbage soft o'erspread,
Where shaggy elms afford a grateful shade,
Where 'neath a rock an ever-flowing spring
With bubbling melody doth sweetly sing.
Come then, my friend, enjoy the present time,
To slight the sacred banquet were a crime."

I spoke; the hoary sage this answer gave:
"May the great god of day thee ever save,
Avert all sorrow, guide thy way to wealth,
Banish all tears, maintain in perfect health,
For this thy love: I, too, as best I may,
Will in some sort thy kindliness repay,
And teach the means, shouldst thou an offering bear,
To force the gods to hearken to thy prayer.—
Take in thy pious hand the *Crystal* bright,
Transparent image of the Eternal Light.
Pleased with its lustre, every god shall hear
Thy vows with favour and concede thy prayer.
But how to test the virtue of the stone,
A certain way I will to thee make known:
Without fire's aid to raise the flame divine,
This wondrous gem lay thou on splintered pine:
Forthwith, reflecting the bright orb of day,
Upon the wood it shoots a slender ray,
Caught by the unctuous fuel this shall raise
First smoke, then sparks, and last a mighty blaze.
Such we the fire of ancient Vesta name,
Loved by the immortals all, a holy flame;
No fire terrestrial with such grateful fumes,
The fatted victim on their hearths consumes.
Yet though of fire the source, strange to be told,
Snatch from the flame the stone—'tis icy cold!
Girt round his loins with this, the sufferer gains
A sure relief from all nephritic pains.—
Another gem, to aid thee in thy vows
Of mighty force my mystic science shows:
As teats of heifers with strange milk replete,
Or teeming breasts of youthful mothers sweet,
This potent stone, by sages old extolled,
Resistless *Adamant* is rightly called;
For that it bends the powers who rule the sky,
To view men's offerings with propitious eye.
The title of *Lethæan* too it bears,
Making both gods and men forget their cares.
With influence bland, it soothes the soul to rest,
And rouses pleasant thoughts in the human breast.
But some the term of Adamant disclaim,
And say that Milkstone is the fitter name;

For if thou rub the stone, then trickling slow,
A milky fluid from its pores shall flow.
Of this thou mayest another proof espye
If e'er the udders of thy ewes run dry;
What canst thou do thy tender flocks to save,
Which erst a refuge from the monster gave?
When pinched with hunger, crowding round thy feet,
Within the fold their piteous tale they bleat?
Thy sickly ewes then bid thy shepherds lave
In the dark pools where sleeps the fountain-wave.
Next, ranged in order 'gainst the rising sun,
With fitting rite thus purify each one:
Take in thine hand a goblet filled with brine,
Mixed with this stone reduced to powder fine;
Thy sheep and goats then carefully go through,
Sprinkling their fleeces with the lustral dew:
Straightway the mothers, of their sickness healed,
To their glad young shall milk abundant yield,
And playful once again the happy lambs
In sportive gambols frisk around their dams.
And bid the bride, but late a mother made,
To drink this gem with honied mead allayed,
That her sweet infant on her flowing breast,
Drunk with the copious stream, may soundly rest.
Hang this, O nurse, about thy charge's neck;
The potent gem the Evil Eye shall check.
Whilst on your hand this virtuous stone you wear,
Kings shall respect, and nations shall revere;
The immortal gods, obedient to your will,
Shall hear your vows, and your desires fulfil.—
Pray with the flowered *Petraces* in thine hand,
When hecatombs before the altar stand.—
Carrying the *Tree-Stone* with thee to the shrine,
Thou shalt propitiate each power divine.
The gem the semblance of a garden shows,
Where growing trees entwine their leafy boughs;
Hence a fit title bears it with the wise,
Who the *Tree-Agate* as a treasure prize:
One part displays the perfect Agate-stone,
In one a shaggy grove is plainly shown.
Tied to their horns let this thine oxen bear,
While turning up thy furrows with the share,

And bid thy ploughman wear the potent charm,
Securely fastened round his sturdy arm;
Then wheat-crowned Ceres shall thy vows attend,
And with full lap upon thy fields descend.—
Shouldst thou by chance the wondrous *Stagshorn* find,
Draw near the altar with undoubting mind;
For the pleased gods, with admiration due,
Creative Nature's strange production view.
A real stone *in* the stag's brain it grows,
Not like the branching antlers, on his brows;
Yet solely by the touch can it be known
To be not horn, but hard and real stone.
If time hath thinned thy locks, its force shall spread
A youthful covering o'er thine aged head;
With this in oil dissolved anoint, and lo!
Fresh honours on thy barren scalp shall grow.
Wear this, O youth, when to thy nuptial bed
For the first time the blushing bride is led;
Wear it as witness of thine amorous play:
Then concord sweet shall crown each future day,
And to old age, unbroken shall endure
The marriage-bond against all change secure.—
Dear to Jove's son is the next gem I sing,
Lord of the herd, the ivy-crowned king!
Of *barbarous name*, washed on those Syrian shores
Where his resounding waves Euphrates pours.
Well pleased with this when to the favouring skies,
For thy vines' sake thy fuming offerings rise,
With clusters huge he shall thy vineyard dress,
And floods of must gush from the labouring press.—
The gods propitious hearken to *his* prayers,
Whoe'er the polished grass-green *Jasper* wears.
His parched glebe they'll satiate with rain,
And send fat showers to soak the thirsty plain.—
Turn, *Lychnis!* from our fields the dashing hail,
And all what pests the growing crops assail.
Dear to the gods, thou canst the sacred blaze
Like to the crystal on their altars raise.
A stranger virtue yet this gem shall show,
When leaping flames round the full cauldron glow,
Cast in the stone: still cold the brazen urn,
Though with full force the fire beneath it burn;

But if the same on embers cold you set,
The bubbling waters in the vessel fret.
The self-same power the sacrificial tribe
Unto the glass-like *Peridot* ascribe.—
With its complexion of a lovely boy,
The *Opal* fills the hearts of gods with joy;
Whilst by the mild effulgence of its light,
Its healing power restores the failing sight.—
Mix myrrh, strong *Opsian*, tears distilled from pine,
With flakes of *Talc* that like to silver shine;
This shall reveal whate'er men seek to know,
And omens give of coming weal or woe.
The flakey Talc doth also drive away
All ailments sore that on the sinews prey.—
Two gems, they teach are sacred to the sun,
Alike divine and wonderful each one;
In each reflected Sol's bright rays appear,
Ranged in straight lines like his wide-streaming hair:
In look diverse: one as the Crystal bright,
The other verges on the Chrysolite,
But for its rays a Chrysolite it were:
The self-same virtues in the two appear.
A mighty spirit Phœbus hath inspired
Within these gems by his own radiance fired:
For all who this great boon shall wisely wear,
Noble their port, and dignified their air;
Heroic majesty their form displays:
The people look and wonder as they gaze.
They that tranquillity with courage join,
Shall best propitiate the powers divine.—
Above all gems, fierce Mars the *Loadstone* loves,
For eagerly to meet the steel it moves:
As the fond maiden, bright in youthful charms,
Strains the loved youth within her longing arms,
So tight the loadstone in its eager grasp,
Holds the loved steel, reluctant to unclasp.
Circe, they say, with magic lore imbued,
Armed with this stone her potent philtres brewed.
Æetes' daughter loved the loadstone too:
That crafty witch who her own children slew.
If e'er thou wish thy spouse's truth to prove,
If pure she hath kept her from adulterous love,

Within thy bed unseen this stone bestow,
Muttering a soothing spell in whispers low:
Though wrapped in slumber deep, if pure and chaste,
She'll seek to strain thee to her loving breast;
But if polluted by adultery found,
Hurled from the couch she tumbles on the ground.
And if two brothers shall a loadstone wear,
Free from all strife abide the friendly pair.
And when the crowds towards the forum roll,
With words persuasive shalt thou melt the soul.
Why needs it more its numerous virtues praise,
When e'en the immortal gods its influence sways,
So that with softened hearts the powers above
Grant all thy wishes with a parent's love?—
Soon will we prove the virtues that I teach,
When we the altar of thy saviour reach,
For yonder slave, companion of my road,
On his broad shoulders bears an ample load.
But since, undone our journey's greater part,
Fear of the monster fills thy beating heart,
Attend whilst I an antidote declare,
No more the trailing serpent's tooth to fear.
Let him who by the dragon's fang hath bled,
On the dire wound *Serpentine* powdered spread,
And in the stone his sure reliance place,
For wounds inflicted by the reptile race.
The *Ostrites* mixed with wine affords again
A quick relief to cool their fiery pain.—
The sacred stone that from the viper came,
Well known to leeches by the *Viper's* name,
Aided by which, divine Machaon's art
Cured of the rankling wound the nine years' smart,
When the despairing hero now no more
Hoped for deliverance from the festering sore:
But taught its virtues by his sire on high,
With this he healed the bold Pœantian's thigh,
And sent him forth rejoicing on his way
To Troy the Phrygian ravisher to slay.
Pierced by his shaft, scarce Paris self believed
That he his death from Philoctete received;
Nor deemed the hero from the Lemnian shore,
With limbs restored, had hastened to the war.

Thus the Pœantean the seducer slew;
But more his fate to Helenus was due,
Who taught the Greeks to bring, O treachery vile!
His brother's slayer from the lonely isle.
To him had Phœbus given the vocal stone,
Hight *Sideritis*, for true answers known;
The living *Ophite*, some the wonder call,
Black, round, and ponderous, a portentous ball;
Around its face, in many a mazy bend,
Like wrinkles deep the graven furrows trend.
For thrice seven days the mighty wizard fled
The bath's refreshment and his consort's bed;
For thrice seven days a solemn fast maintained,
Nor flesh of living thing his strength sustained.
Then in the living fount the gem he laves,
And in soft garments like an infant swathes,
As to a god, he sacrifices brings,
And potent spells in mystic murmurs sings,
Till moved by fervent prayer and mighty charms,
A living soul the prescient substance warms.
Then in his hands he bears the thing divine
Where kindled lamps in his pure mansion shine,
And as her infant son a mother holds,
So in his arms the talisman he folds.
And thou, if thou wouldst hear the mystic voice,
Thus do, and in the wondrous thing rejoice:
For when thou long hast dandled it on high,
'Twill utter forth a faint and feeble cry,
Like to a suckling's wail when roused from rest,
It seeks refreshment from the nurse's breast.
But with courageous heart perform the rite,
Lest thou the anger of the gods excite,
If from thine hand, unnerved by panic fear,
Down to the ground thou dash the magic sphere.
Be bold, and dare the oracle to test,
A true response 'twill yield to each request;
Then having bathed it, hold it to thine eye,
And mark in wondrous guise its spirit fly.
Through this the Trojan to the Atridæ bold,
The coming downfall of his race foretold.
Another virtue hath the stone, 'tis said;
Since thou still tremblest at the serpent dread:

Far greater fear, ne'er slumbering day or night,
Had Philoctetes of the viper's bite:
Hence he sage Priam's son with prayers pursues,
Falls at his feet, and low for counsel sues,
To teach some charm that far away should chase,
Whene'er he reached his home, the reptile race.
Touched by his prayer, the wizard high reveals
The sought for antidote, nor ought conceals,
Invokes Apollo witness of his truth,
And gives these precepts to the suppliant youth:
"The god of oracles with radiant hair,
From whom these gifts of prophecy I bear,
First on my youth a solemn oath imposed,
Ere he the science deep to me disclosed,
Never to man a false response to make;
Therefore with fullest trust my answer take,
And list, O lord of the unerring bow,
The wondrous lore that I prepare to show.
For all the pests that out of the earth arise,
The earth's ownself the antidote supplies;
She breeds the viper, but she to the sage
The means presents to quell the viper's rage.
All kinds of gems spring from her bosom wide,
And hapless mortals with sure help provide;
For all what virtues potent herbs possess,
Gems in their kind have, nor in measure less:
Great is the force of herbs, but greater far
The virtues that in stones inherent are;
For in the stone implanted mother earth
Eternal force, unfading, at its birth.
Short-lived the herb, it quickly fades away,
And but in life its potency bears sway;
When past its prime, it dry and withered lies;
And what help find we in a thing that dies?
Plants as the source of death and health we own,
But scarce canst thou find mischief in a stone.
As numerous as the flowers spring from the ground,
So many gems are in earth's bosom found.
Midst serpents then, with *Sideritis* armed,
Securely walk, against all danger charmed.
What though their swarming hosts around thee roll,
No thought of peril need disturb thy soul;

Awed by the spell they fear their fangs to use,
Though with bare feet their scaly coils thou bruise.
With wonder filled, at thine approach they fly,
Nor dare to face the terrors of thine eye;
E'en those at first prepared at thee to leap,
Fall to the ground, and tamely backward creep:
The potent spell their headlong fury checks,
They stop and elevate their gilded necks;
And to their lord in tame submission drawn,
With forked tongues, like dogs they on thee fawn.
The hunter-boy, confiding in its aid,
In Ida's thickets oft securely laid,
Euphorbus 'mid the speckled dragon's brood,
Uninjured slept, though thirsting for men's blood.
For to his prayer the sacred stone I gave,
And ne'er a serpent dared his glance to brave.
Brave Melanippus loved his beauty bright,
And in his presence found his sole delight:
My cousin he, himself of graceful mould,
But yet his worth his beauty's praise out-told.
Following the fair-haired youth with constant love,
Never without him in the chase he'd rove;
But o'er the mountains still with train and hound,
He tracked the game in many a devious round:
Full often longed great Icetaon's son,
To follow his loved comrade all alone.
Him oft his father checked with anxious care,
Dreading the perils of the sylvan war,
And often royal Priam would detain
The ardent youth, but still had tried in vain;
For who would live deserted at the court,
And leave Euphorbus to his woodland sport?
Yet soon a serpent checked the impetuous youth,
Piercing his ankle with envenomed tooth.
The hero, conscious of the deadly wound,
Keener than death the pain of parting found;
Prone at my knees for aid to me he prays;
I pity, and the wounded hunter raise,
And bid him take, to finest powder ground,
This stone, and sprinkle on the burning wound.
Instant the deadly venom quits his veins,
And the glad youth his former strength regains.

Such are the virtues of the *Mountain-stone*,
As sure relief to wounded heroes shown,
Makes too the barren woman to conceive:
The gods for mortals all things can achieve.
Such rules the wise Abarbareia taught
(My mother she), with healing science fraught.—
Euphorbus sings the *Serpentine* is good,
Not merely 'gainst the serpent's scaly brood,
But hence the darkling eye new light obtains,
And from the head it drives the heavy pains.
Aided by this he healed the deafened ear,
And gave it power the lightest sound to hear.
The unhappy youth on whom hath Venus frowned,
All impotent for love's sweet pleasures found,
Strengthened by this renews his former fires,
And feels his veins inflamed with fresh desires.
Its fumes in burning reptiles chase away,
Though hid in holes they shun the light of day.
Such flee, when *Jet* in rising clouds consumes,
The nose provoking with its pungent fumes.
Black as a coal, but yet of lustrous shine,
It blases up like torch of driest pine;
But strange its influence on the human brain,
Nor can the wretch disguise his hidden pain,
From whom the dire disease we seek to purge,
Sent down from heaven the human race to scourge.
Soon as his nostrils feel the potent smoke,
Headlong he falls as from the lightning's stroke;
Covered with foam, in fierce convulsions bound,
He rolls and writhes and struggles on the ground;
Malignant Luna, tyrant of his brain,
Surveys his torture and enjoys his pain.
But if a woman o'er its vapours bend
And catch the healing fumes as they ascend,
Long pent within by circulation slow,
At last dissolved the noxious humours flow;
She marks the flux, and conscious of release,
Departs exulting, 'scaped the fell disease.
Yet other virtues to the stone are lent,
But with its power o'er snakes thou'lt be content.—
Named from the scorpion dire, the virtuous stone
To huge Orion was, I ween, unknown,

Else had he, tortured by its fiery pain,
Paid all his stars the remedy to gain.
Nor yet the gem he knew that quells the smart
Of scorpion, archer armed with deathful dart,
For, mixed with garlic's juice, 'twill surely chase
From their deep lurking holes the poisonous race:
Like to the human head in shape it grows,
And mixed with sharpest wine its virtue shows.
This medicine e'en the venomed asp can quell,
The asp, sure minister of gloomy hell!
To cure the throat, grind this with fragrant oil
From roses pressed and mixed with beastings boil;
Mingled with honey 'twill the mass dispel
Of watery humours which the belly swell,
Or which, descending from their proper place,
With an unseemly load the groin disgrace.—
The *Coral* too, in Perseus' story named,
Against the scorpion is of might proclaimed.
This also a sure remedy shall bring
For murderous asp, and blunt his fateful sting.
Above all gems in potency 'tis raised
By bright-haired Phœbus and its value praised;
For on its birth it shows a wondrous change;
True is the story, though thou'lt deem it strange:
At first a plant, it springs not from the ground,
The nurse of plants, but in the deep profound
Like a green shrub it lifts its flowery head
Mid weeds and mosses of old ocean's bed;
But when old age its withering stem invades,
Nipped by the brine, its verdant foliage fades,
It floats amid the wrack of sea-things tossed,
Till roaring waves expel it on the coast;
Then in the moment that it breathes the air,
They say who've seen it, that it hardens there,
Or as by frost congealed and solid grown
The plant is stiffened into perfect stone:
And in a moment in the finder's hands,
Erst a soft branch, a flinty coral stands:
Yet still the shrub its pristine shape retains,
Still spread its branches, still its fruit remains,
The bark yet there though turned to stone we view,
And yet the root whence in the depths it grew.

A sweet delight to the beholder's eye,
My heart its aspect fills with speechless joy,
My longing gaze its beauty never tires,
But yet the prodigy with awe inspires:
Though to the legend I true credit give,
Scarce do I hope it credence will receive;
But yet to men, I ween, no lying fame
Hath sung the terrors of the Gorgon's name,
No idle tale the feat of Perseus, high
On airy wings careering through the sky,
Or how the hero slew 'neath Atlas' rocks
The dire Medusa tressed with snaky locks,
Monster invincible, with eyes of hell,
Fatal to all on whom her glances fell,
Who under that intolerable eye
To marble statue stiffen ere they die.
E'en Pallas self, indomitable Maid,
Shrunk from the terrors of that look, afraid,
And warned her brother of the golden glaive
To avert his eyes as he the death-blow gave.
Thus by a wile he won the monster's head,
And severed from the neck her serpent's dread,
And stealing from behind with noiseless wheel,
Drew round her throat the curved Cyllemal steel.
Though slain the Gorgon, yet her face retains
Its ancient terrors and its force remains,
And many yet were fated by the sight
The realms to enter of eternal night.
Dripping with blood the hero seeks the shore,
And, whilst he cleanses from his hands the gore,
Still warm, still quivering, lays his trophy down
On the green sea-plants all about him strown,
Whilst tired by toil and by his weary way
His limbs he freshens in the cooling sea.
Pressed by the head the weeds around that lie
Soaked with the gore, grow drunk with sanguine dye;
The rushing breezes, daughters of the flood,
Upon their boughs congeal the clotted blood,
And so congeal, it seems, a real stone
Nor only seems; to real rock 'tis grown.
What though of softness every trace be reft,
To the dry plant its pristine shape is left,

Tinged by the blood that from her arteries flows,
No longer green, with blushing red it glows—
Struck with surprise the dauntless hero stares,
E'en wise Minerva his amazement shares,
And that her brother's fame may last for aye,
Gives power unfading to the coral spray
Ever its early nature thus to change:
She next endowed the plant with virtue strange,
And to its kind a lasting influence lent
To guard mankind on toilsome journeys bent,
Whether by land their weary way they keep,
Or brave in ships the terrors of the deep—
Of furious Mars to 'scape the lightning sword,
Or murderous onslaught of the robber-horde.
When the vexed Nereus tosses all his waves
The potent Coral trembling sailors saves,
If they with vows the warlike blue-eyed Maid
Invoke, and claim in their distress her aid.
All drugs that poison, all the spells that bind,
All curses that relentless Furies mind,
The hid pollution that brings ruin down
Upon the house e'en to its lord unknown,
And all the ill wrought by enchantment dire
Against thy weal when envious men conspire,
For all these evils by benignant heaven
The Coral surest antidote is given.
Pound this and mix it when thou sowest thy grain,
It shall avert all mischief from the plain,
The drought which parches with destruction sere
The milky juices of the swelling ear;
The million darts which flung by driving hail
With hopeless wound thy growing crops assail;
Destructive insects too it scares away,
The caterpillar's troop, the worm's array,
The rust which falling on thy corn from high
Reddens the ear and burns its substance dry,
The host of flies, the locust's countless swarms,
E'en Jove's red lightning from thy field it charms,
Such honour pays he to the glorious deed
Of his great son, and grants the worthy mede.
And *this* returning from earth's furthest shore
His choicest gift to man sage Hermes bore.

But thou, still mindful of its virtue high,
Drink it in wine, and poisonous asps defy.—
Drink too the changeful *Agate* in thy wine,
Like different gems its numerous species shine,
The glass-green jasper oft its hue betrays,
The emerald's tint, the blood-red Sardian's blaze,
Sometimes vermilion, oft 'tis overspread
With copper dull, or the early apple's red:
But best of all the sort whereon is spied
The tawny colour of the lion's hide;
This kind by ancient demi-gods was famed,
And from its hue *Leontoseres* named,
All mottled o'er with thousand spots 'tis seen,
Some red, some white, some black, some grassy green.
If any groaning from the scorpion's dart
Should sue to thee to heal the venomed smart,
Bind on the wound or strew the powdered stone—
The pain shall vanish and its influence own.
Adorned with this, thou woman's heart shalt gain,
And by persuasion thy desire obtain;
And if of man thou aught demand, shalt come
With all thy wish fulfilled rejoicing home.
Held in the hand, this may protection give
In dire disease, and bid the sick man live,
If yet the sovereign ruler of the sky
A longer span of life doth not deny:
But this thou knowest, that if his vital thread
Stern Clotho cuts, full sure his life is sped.
When fiery tertian e'er thy limbs invades,
Or shivering fever brings thee near the shades,
Or the slow quartan's lingering plague shall seize
Ne'er to be banished, ever fixed disease—
All such thou by the Agate's aid may'st heal,
None else more sovereign can my skill reveal—
One thing alone will certain proof supply
To test the powers that in the jewel lie,
Midst seething meat if thou an Agate throw,
The softened flesh shall sink dissolved below.
Yet nought avails it for the viper's sting:
For *that* another remedy I sing,
Sent down from heaven, with healing virtue blest;
Treasure my words within thy mindful breast.—

When Uranus, as ancient legends say,
Maimed by the cruel scythe of Saturn lay,
And writhed in torture o'er the blue profound,
From heaven's high vault self-dashing to the ground,
That with his shaggy back, to ruin hurled,
With thickest darkness he might blot the world,
Lest cruel Saturn, author of his woes,
In realms once his, might undisturbed repose;
The immortal blood fast issuing from his wound
In copious streams fell raining on the ground,
The drops proceeding from thy sacred veins
Fate suffered not to perish on the plains;
But for thy blood a resting-place she found,
Sire of the gods! within earth's lap profound—
There it remains: Sol's horses, fiery-eyed,
With their hot glance the holy relic dried:
Though to the touch a stone, its substance holds
Its ancient nature and true blood enfolds—
For still as red as blood its colour burns,
And slaked in water it to blood returns.
The *Stone of Blood* 'twas by the ancients styled,
And justly praised for all its virtues mild.
Poets with truth have sung its heavenly birth
In showers divine descending upon earth;
For it allows no new complaint to seize
The eyes, but quick dispels each old disease.
This comes if mixed with whey of milk so pure,
For ground with honey 'twill the eyelids cure.
It grieves the stone that sealed by blindness' night
The eye of man should be begrudged the sight
Of that bright face which from the welkin shows
The ancientest of gods with high-arched brows.
Through it the eyeballs with fresh lustre shine:
E'en impotence it cures if mixed with wine.
When bent to bear Achilles' arms away,
Fierce Ajax hastened to the wordy fray,
Long I besought him in his hand to bear
As pledge of sure success this mineral rare.
Aided by this bold Ajax had prevailed,
And e'en Minerva had his victory hailed,
Though by that triumph from Ulysses wise
The giant chief had snatched the glorious prize.

But to my counsels a deaf ear he turned,
My proffered aid he obstinately spurned,
And seized his fatal sword—shun thou his fate,
Nor slight my counsels till it be too late—
But since thou knowest the medicine to be good
Against the slippery viper's scaly brood,
Advise thy friends to drink it, timely wise,
Mixed with the draught the Naiad's urn supplies.
Thus, I once wishing my swift-footed friend,
Dolon, to mighty Hector to commend,
To his petition lent a ready ear,
The heaven-born stone conceding to his prayer.
Whence he above all other Trojans placed,
With Priam's, as with Hector's, favour graced,
My service to requite, for present brought
The *Liparæan* stone with virtue fraught;
Which erst his sire directed by my lore
Envoy to Memnon from Assyria bore;
More precious far than gold the prize he gained
From learned Magians through rich bribes obtained.
Treasure my words in thy believing heart,
Whilst I my own experience here impart.—
First to the bloodless altar shouldst thou haste
Whereon no living victim e'er was placed;
With pious hymns on radiant Phœbus call,
And Earth, great mother giving suck to all:
Next melt this stone amid the rising flames,
Whose odorous fumes the long drawn dragon tames:
They as they mark the vapour mount on high,
Forth issuing from their holes towards it fly,
And hastening onwards in a long array
The altar seek, nor shun the unwonted day.
There let three youths robed in white vestments stand,
Each with a sword two-edgèd in his hand,
And seize that snake which nearest to the blaze
Snuffing the fumes his spotted coils displays,
Then cut his body as he slaughtered lies
In portions nine, each one of equal size;
Three of all-seeing Sol the portions call,
And three of Earth, the mother of us all,
And three the portions of the goddess dread,
The omniscient prophetess, the unsullied Maid;

These pile together in a blood-red bowl,
And pour the gift of Pallas o'er the whole,
The ruddy liquor of the jolly god,
With sparkling salt, the attendant on our food,
And brought from Eastern lands the pungent spice,
Rough-coated, black, and of enormous price,
With other condiments that serve to excite
The dormant powers of jaded appetite.
While seethes the caldron o'er the tripod's flame
Invoke each godhead by his *secret* name:
Full well the powers above are pleased to hear
Their mystic names rise with the muttered prayer.
Pray that Megæra, aye devising hurt,
Far from the bubbling caldron they avert,
But that the spirit from the fount of light
Down to the sacred mess may wing his flight.
When boiled the flesh the mystic feast prepare;
But from the tripod let each eat his share,
All that is left the earth must cover o'er:
Last, on the hallowed spot libations pour,
Milk and the ruddy wine and fragrant oil,
With these combine the beehive's flowery spoil:
And, last, with chaplets woven from the boughs
Dear to the virgin goddess crown your brows;
Nor let it shame you though in open day
Stripped of your robes to take your homeward way,
Nor once turn back as from the place ye come,
But with your eyes bent forward hasten home;
And if a traveller meet you as ye go,
Beware no greeting on him ye bestow;
But offered to the gods, on your return
Let fragrant spices on the altar burn.—
Such rites performed, all future things I know:
What the airy birds by all their warblings show,
What beasts of prey as through the woods they prowl
Denote, loud answering with responsive howl.
Hence known to me the *Nebrite*, gem divine,
A gift to mortals from the god of wine:
The gods with favour its possessor see,
Accept his offerings, to his prayers agree.
If with revengeful fang the serpent fierce
Pressed by the incautious foot thy body pierce,

The potent Nebrite heals the venomed smart.
To wives it also binds their spouses' heart.
Hence were thy priceless virtues to me shown
Against the deadly asp, life-saving stone!
Which from the bright-green *leek* deriv'st thy name;
The *Prase*, an antidote well known to fame;
A green-hued gem that to the admiring gaze
The style and colour of the leek displays.
Hence was I moved thy healing might to try,
Chalazias pure! and proved its potency.
In thee relief I found in fever's glow,
And sure remede against the serpent's blow.—
Son of Latona! this thy lore revered,
Still full of doubt the brave Pœantian heard:
And on my sister, that prophetic maid,
A heavy doom the vengeful Phœbus laid,
When to her warning voice as falsehoods spurned
A stone-deaf ear the mocking Trojans turned.
But I of yore a mighty oath did take
Never to man a false response to make:
Wherefore, bold archer! with confiding breast,
Receive for truth these words to thee addressed."—
Old Priam's son with precepts such as these
Consoled the friend of fearless Hercules;
And we, whilst yet our bourn far distant showed,
Thus with sweet converse smoothed the rugged road.

NOTE ON THE OPHITES, OR ORITES.

The *Salagrama*, or sacred stone of Vishnu, so much used by the Brahmins in all propitiatory rites, especially at the moment of death, is described by Sonnerat as a kind of *Ammonite*, very *heavy*, oval, or round, *black:* the very wrinkled, ponderous, round, black orites of Orpheus. Sometimes its colour is violet, which, representing a vindictive avatar of the god, is looked upon with horror. It resembles touchstone, and is concave on the reverse, with spiral lines terminating towards the centre. It is hollow, with only a single small aperture. The possessor of one keeps it wrapped up in a linen cloth, often perfumes and bathes it, and the water thus used is highly valued for its sin-repelling properties. But Colebrook describes the stone as round and black, perforated with spiral holes as if by worms, done by Vishnu's own finger, of which the form and number typify the god under different characters. The substance is silicious. They are found in the Gandaci river in Nepal. The agreement in colour, weight, and spiral arrangement of the "deep-furrowed lines," proves the orites and this stone to have been identical. Observe it is given to Helenus

by Apollo, *i.e.* Chrishna, the most splendid of Vishnu's avatars. The magi may easily have got the stone from the Brahmins, along with so many other particulars of their religion.

STONES DESCRIBED IN THE POEM.

Crystal	.. ..	170	Opal	.. .. ..	282	Jet	.. .. ..	470
Adamas, Galactites	..	180	Amber	.. ..	285	Scorpius	.. ..	490
			Sunstone	.. ...	290	Human Head	..	495
Petraces	.. ..	230	Loadstone	... ...	305	Coral	.. .. ..	500
Tree-Agate	.. ..	235	Ophites	.. ...	335	Agate	.. .. ..	605
Stagshorn	.. ..	240	Ostrites	.. ..	340	Hæmatite	.. ..	640
Barbarian	.. ..	255	Echites	.. ..	345	Nebrites	.. ..	742
Jasper	.. .. ..	265	Sideritis	.. ..	355	Prase	.. .. ..	750
Lychnis	.. ..	270	Orites	.. .. ..	450	Chalazias	.. ..	755
Peridot	.. ..	280						

ON THE AUTHORSHIP OF THE POEM.

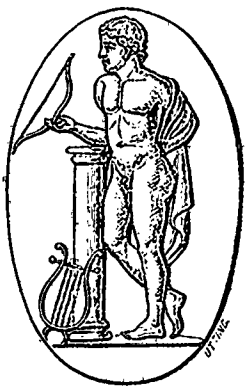
This poem is considered by Tyrwhit to be the production of some Asiatic Greek, and written in the 4th century, after the profession of magician had been made a capital offence by the law of Constantius, passed in his ninth consulship. He even conjectures that the "god-like prophet" alluded to (v. 74) may be the philosopher Maximus (who instructed the Cæsar Julian in divination), put to death under Valens for alleged complicity in the plot of Hilarius and Patricius. But this hypothesis appears to me to rest on no sufficient grounds. Had he written as late as the reign of Valens, the author could not have spoken of sacrifices to the gods as being matters of public and of regular occurrence; and certainly he would not have let slip the opportunity of inveighing against the Christians, the triumphant enemies of the old established system. As it is, his reflections upon the ignorance of mankind, their hatred of virtue, and the suspicion with which they regarded magicians, would all apply equally well to any preceding period of the empire, when others were frequently condemned on the charge of magic practices: whilst the obscure allusion to the prophet's decapitation seems rather to apply to the death of Orpheus, who is mentioned in the lines just before. For the poem is only quoted as the "work of Orpheus" by Tzetses in the 12th century in his notes on Lycophron; whereas the very few MSS. now containing it prefix no author's name. In fact, another poem, "On Ceremonies," found in the same collection, is there actually ascribed to Maximus himself, a circumstance which appears to have induced Tyrwhit to place this one also at the same low date.

But if any competent scholar will take the trouble to compare it with the Argonautica, which also goes under the name of Orpheus, he will not in my opinion fail to perceive both to be works of the same hand. The close resemblance in the versification, in the fondness for spondaic endings, in the diction, in the reduplication of epithets, and the peculiar form, marking a purely Grecian date, under which the tender passion appears, all clearly prove this common origin. The Argonautica, being comparatively a mere sketch, must have preceded the elaborate composition upon the same theme of Apollonius Rhodius. The story of Orpheus differs from the latter in many important particulars,

besides being narrated in a much more primitive form; indeed it is hardly conceivable that any one coming after Apollonius should have attempted to compete with an epic of such established reputation; or that having such audacity he should have deviated so far from his prototype. But the question of the antiquity of the Λιθικὰ is set at rest, if we accept the authority of the scholiast "Demetrius son of Moschus," who states positively that it gave Nicander the idea of his Theriaca. Now Nicander flourished under Attalus III., or B.C. 135, which circumstance supposes a much higher antiquity in the work selected for a model by a writer of no mean order.

There are many expressions in Pliny when he is laughing at the mystic powers ascribed to stones by the magicians of his own times which seem direct allusions to certain passages in this very poem. In addition to what has been said above upon the internal evidence of the work itself, the poetry is certainly of a better kind than could have been produced by a Greek of the Lower Empire, especially when treating of religious topics, as will appear from comparing it with the Sibylline Oracles, the forgeries of that period.

Who the narrator is does not appear. The precepts are given in the first place by a certain diviner, Theodamas, who subsequently quotes to the end the speech of Helenus to Philoctetes. The tale of Troy and the events of the siege being frequently referred to by the first narrator, the absurdity of supposing him to be Orpheus becomes still more apparent: for that worthy was the comrade of the Argonauts in the preceding generation. The text being extremely corrupt, I have not scrupled to adopt the emendations of Gesner and Tyrwhit in this translation wherever it was impossible otherwise to extract any sense from the reading of the MSS.



JEWELRY OF THE ANCIENTS.

All the magnificent works in which the artist-goldsmiths of Asia, Greece, and Rome displayed their wondrous taste and skill, have utterly perished. Of their magnificence we can form but an inadequate idea, of their excellence in point of art the personal decorations of small intrinsic value yielded to modern discoverers by the Greek and Etruscan tombs, suffice to give us an example. The sole relic that has escaped the barbarian spoiler of the lavish splendour of imperial Rome is the Patère de Rennes already described.

There exist, however, three monuments which exhibit the Roman art, though in its most degraded state and as practised by barbarian craftsmen; and these both for their rarity and their historical interest are well deserving of a particular description. They therefore shall be taken in chronological order.

HISPANO-GOTHIC CROWNS.

In the year 1858 some labourers employed in bringing under cultivation a deserted cemetery at Fuente di Guerrazzar, two leagues from Toledo, came upon a deposit of eight crowns and coronets in gold adorned with gems, the intrinsic value of which is calculated at 2000*l.* The whole treasure-trove quickly found its way to Paris, where it was without any needless delay (or reference to ignorant *Trustees*) secured by the proper authorities for the Musée de Cluny, of which it now forms the most interesting feature, being ingeniously displayed to public inspection within a glass case, accessible on every side.

Of these the most important is the crown of King Receswinthus (A.D. 653), a broad circle of fine gold, eight inches in diameter, set with thirty uncommonly large Pearls, alternating with as many fine Sapphires. This band is edged with a border above and below, filled with a running pattern of Greek crosses

of red pastes *cloisonnées* in gold. From twenty-four little chains hang these letters of gold encrusted with pastes like the borders,

+ RECESVINTHVS REX OFFERET.

From the letters again are suspended twenty-four *pendeloques* in gold, and five Pearls, which support twenty-four pear-shaped Sapphires, forming a fringe all round the circumference. Lowest of all comes a very magnificent Latin cross of truly elegant design, four inches long, set with eight enormous Pearls[1] and six equally splendid Sapphires, and having three pendants from the arms and foot cut out of square *pastes*. In this cross the gems are set *à jour;* the back of their collets being filled in with a rose-ornament in filigree. The settings themselves are exquisite, the claws holding the stones being fleurs-de-lys. This cross is the finest example in existence of ancient goldsmith's work.

The second crown, supposed to have been his queen's, is set with *Emeralds*, Sapphires, Opals, large Pearls (fifty-four in number), and has a fringe like the first, but of crystals[2] and pastes. It has a pendent cross also set with Sapphires, but is quite plain in form and of small intrinsic value.

The others are much simpler, and set with but few and inferior stones; they were evidently those of contemporary counts and barons. Three of these coronets are most singular in make; an open grating with gems set at each intersection of the bars; from each hangs a flat cross *pâtée* jewelled, one of them bearing Sonnica's votive inscription. The remaining three are much lighter, and are simply ornamented with arcades in *repoussé* work in the common Byzantine style. The small diameter of the last six shows that they were not designed to be worn, but merely for votive offerings. The two principal crowns, however, open with hinges, and the queen's has a row of rings along the edge evidently for the adjustment of a lining. All have gold chains proceeding from a centre or hook for suspension. In the king's crown this centre is artistically cut out of a large crystal into the pattern of a Byzantine capital, about one inch deep and wider across the top; around this again spread gold acanthus-

[1] The Pearls are as big as ordinary cherries, the Sapphires of the best colour, those in the middle row as large as pigeons' eggs, all *cabochons*, the centre one very protuberant.

[2] I strongly suspect from their shape that some of these "crystals" are in reality rough diamonds: that stone could hardly have been omitted from this assemblage of all that was most precious amongst the spoils of Rome.

leaves supporting small pendants. The chains depending from it are stout flat almond-shaped pieces of pierced work.

It is curious to observe in some cases bits of mother-o'-pearl set amongst valuable stones: and square pastes now colourless side by side with the richest: perhaps they were passed off upon the Goth for real Opals by the Emmanuel of the day. It is very singular that neither the Ruby nor the Carbuncle appear at all, the stone must have been purposely left out for some mystic reason, probably as being regarded of too *Martial* a dye.

Most interesting, as it explains the destination of the treasure, is a large Greek cross bearing the inscription on both sides—

INDNI NOM INE OFFERET SONNICA SCIE	MARIE INS ORBA CES·

which records its dedication by Sonnica in the church of S. Maria in Sorbaceis, "in the grove of sorb-apples," supposed to be the present S. Maria de Abaxo, placed at the foot of the hill on which stands the city of Toledo.[3]

It may be remarked here that the Visigoths had enjoyed "the first pick" of the plunder of the dismembered empire. "The nuptial gift which, according to the custom of his nation, was offered to Placidia (by Adolphus, Alaric's brother and successor) consisted of the rare and magnificent spoils of her country. Fifty beautiful youths in silken robes carried a large basin in each hand, and one of these basins was filled with pieces of gold, the other with precious stones of an inestimable value" (Photius quoting Olympiodorus).

CROWN OF CHARLEMAGNE.

CHARLEMAGNE was crowned Emperor of the West by Pope Leo on Christmas-day, A.D. 800, in the church of St. Peter's, Rome. His crown may have been made in that city for the occasion; certainly its ornamentation has more of the Byzantine than the

[3] M. Lasteyrie has published a full description in 4to of these crowns, illustrated with facsimiles the actual size in chromolithograph. These plates are the most successful specimens of the art known to me, the gems appearing as if actually before the eye.

Frankish style. It is octagonal, formed by eight plaques of gold with round tops, which thus make a scalloped border to its upper part. Each alternate plaque bears the figure of a saint in enamel. The front plaque is set with large stones in cabochon (Sapphires?), and others cut square after the fashion of table-diamonds. Above all rises a Greek cross, also set with large stones: gems of less importance are also interspersed upon the other plaques. From the cross springs an arch like a flying buttress which gives stability to the entire fabric. Frederic Barbarossa, in the year 1166, canonized Charlemagne, and took advantage of the occasion, like a true Teuton, to despoil his sepulchre of the crown, besides the enormous mass of treasure there deposited, the golden throne, the two shields of gold, &c. Since that time it was used at the coronation of the succeeding German emperors, and the Elector Palatine had the custody of it *ex officio*. The Austrian Francis, as the last in the Imperial series, having possession of the crown took care to retain it, and it now rests in the Imperial Library of Vienna, a mere monument of antiquity.

CROWN OF HUNGARY.

THIS memorial of the first establishment of Hungarian nationality has ever been regarded with superstitious veneration by every true Magyar, and authenticated every coronation of the kings of that country until the shameful overthrow of its liberties and constitution in our own times. It is in truth a most venerable relic of the regular Byzantine art; and is formed by a broad flat band of fine gold, whence springs an arch, supporting a cross. It was sent in the year 1072 by the Emperor Michael Ducas to Geisa, the first Duke of Hungary, or, as he is strangely styled in the enamel portrait of him upon a plaque rising above the top of the circlet, "Geabitras, king of the Turks." Next to this comes the portrait of Constantine Porphyrogenitus, then one of Ducas himself; the fourth, and largest enamel represents the Saviour enthroned exactly as he figures upon the bezants of that period. These four portraits are set at the springing of the arches which close the top of the crown: on the front of the band itself are placed four smaller enamels of the angels Michael and Gabriel, St. George and St. Demetrius.

Over the medallion of Christ is a large heart-shaped Amethyst, below it an enormous rough Sapphire; four more large Sapphires

are set at equal distances on the band, all but one being unpolished. The edges of the circlet are bordered with a row of Pearls set close together. The large Sapphire at the back is surrounded by four green stones, cut oblong; but their exact species has not been ascertained. In the deed by which Queen Elizabeth of Hungary pledged this crown to the Emperor Frederic IV., the stones are enumerated as being 53 Sapphires, 50 Rubies, *one Emerald*, and 320 Pearls. It is singular that the four green stones at the back are not entered in this list; perhaps they are in fact only prases, and therefore not reckoned amongst the other stones of value.

It will be remarked from the foregoing details that, although the Byzantine jewellers had still at their command abundance of Sapphires and of the finest quality, the true Emerald had become very scarce. Yet late under the Lower Empire it was still profusely employed in the decoration of the imperial vestments, although ever accounted as next in value to the Diamond. Claudian enumerates amongst the treasures left by Theodosius under the guardianship of Stilicho—

> "Sidonias chlamydes et cingula baccis
> Aspera, gemmatasque togas, viridesque smaragdis
> Loricas, galeasque renidentes hyacinthis."
>
> "Sidonian mantles rich with purple fold,
> Belts bossed with pearls, robes stiff with gems and gold,
> And breastplates shining green with emeralds bright,
> And helmets rich with precious sapphires dight."

In illustration of the last line, it may be remarked that his predecessor Constantine often figures upon his copper coinage in a helmet studded with gems set close together. This jewelled helm was the origin of the crown imperial in its present form; the gradual transition from the defensive to the decorative head-covering being easily traced upon the series descending of the Byzantine solidi. As to the excess to which this department of luxury, like all the rest, had been pushed by the Romans of more opulent times, a single anecdote of Pliny's will be a sufficient example (ix. 58):—

"I have myself seen Lollia Paulina (once the wife of the Emperor Caligula), though it was on no great occasion, nor she in her full dress of ceremony, but at an ordinary wedding-dinner —I have seen her entirely covered with Emeralds and Pearls strung alternately, glittering all over her head, hair, bandeau,

ears, neck, necklaces, and fingers,[1] the value of all which put together amounted to the sum of forty millions of sesterces (400,000*l.*), a value which she was ready to attest by producing the receipts. Nor were these jewels the presents of a prodigal Emperor—they were regular family heirlooms; that is to say, bought with the plunder of provinces. This was the end gained by his peculations, this the object for which M. Lollius made himself infamous all over the East by taking bribes from its princes, and at the last poisoned himself when C. Cæsar, Augustus' adopted son, formally renounced his friendship—all for this end, that his granddaughter might show herself off by lamplight bedizened to the value of forty millions of sesterces. Let any one now count up on the one side the sums carried in triumph by a Curius or a Fabricius, let him picture to himself their scanty display of spoils; and on the other side, Lollia, a wretched female, a tyrant's plaything, seated at the feast; would he not rather have seen them dragged down from the triumphal car, than to have conquered for an end like this?"

A notice in Lampridius (Maximini Fil. Vitâ) gives us a curious peep into the trousseau of a Roman princess in the 3rd century: "Junia Fadilla, his betrothed bride, retained (after his murder) the imperial wedding-presents, viz.—Necklaces of single Pearls, nine; hair-nets of Emeralds, eleven; bracelets with clasps of *true*[2] Hyacinths, four."

Caylus (vii. pl. 70) figures a necklace that gives a good notion of the style of Lollia's jewelry. It consists of fourteen short six-sided prisms of plasma, and six irregular pastes connected together by two gold links between each. The plasmas are one-third of an inch long, and very neatly cut. Amongst the finest specimens now extant, comes undoubtedly the one formerly in the Uzielli Collection (No. 637), composed of true-love-knots in gold, uniting large irregular Rubies and Emeralds (fine stones), each perforated at the ends. Lucian (Dial. Meret. vi.) makes the girl Corinna beg her mother to "buy her a gold necklace, having on it some fiery stones, like that of Philinnis." These people are of the lower class, these fiery stones therefore must have been common Garnets, of which abundance of beads are found shaped exactly as the plasmas above mentioned.

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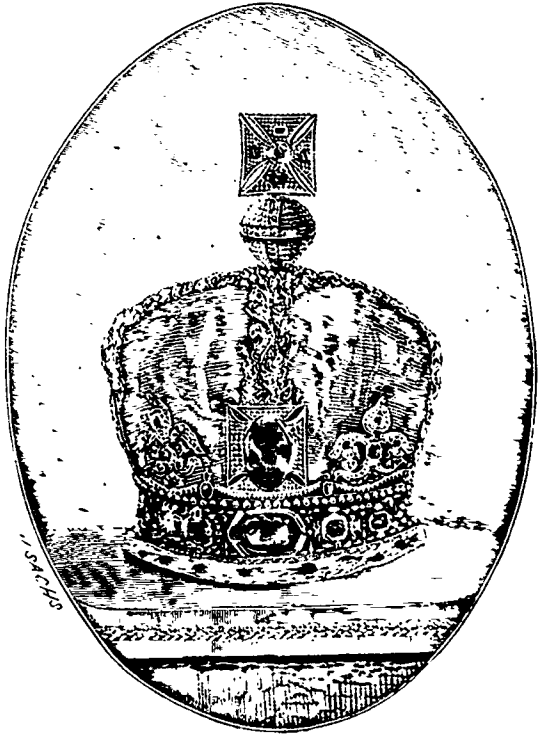
[1] Reminding us of Sedley's lines—

"Such ropes of pearls her arms encumber,
She scarce can deal the cards at ombre;
Such loads of rings her fingers freight,
They tremble with the mighty weight."

[2] A singular qualification: can it be to distinguish them from our amethysts, probably at that time reckoned amongst the hyacinthi?



Imperial State Crown of England.

To face p. 405.

Before dismissing this subject, its national interest pleads for a brief notice of a crown, though of no historical celebrity, all the ancient regalia having been sold by order of the Commonwealth Commissioners. Yet a few of the most important stones were recovered from the purchasers, and employed in the crown made for the coronation of Charles II., and again introduced in that now in use. The following is an exact copy of Prof. Tennant's description of the Imperial State Crown of England:—

"The Imperial State Crown of H.M. Queen Victoria was made in the year 1838 by Messrs. Rundell and Bridge, with jewels taken from old crowns and others furnished by command of Her Majesty. It consists of diamonds, pearls, rubies, sapphires, and emeralds set in silver and gold: it has a crimson velvet cap with ermine border, and is lined with white silk. Its gross weight 39 oz. 5 dwts. troy.[3] The lower part of the band above the ermine border consists of a row of 129 pearls; and the upper part of the band, of a row of 112 pearls, between which in the front of the crown is a large sapphire (partly drilled) purchased for the crown by H. M. King George IV. At the back is a sapphire of smaller size, and six other sapphires, three on each side, between which are eight emeralds.

"Above and below the seven sapphires are fourteen diamonds, and around the eight emeralds 128 diamonds. Between the emeralds and sapphires are sixteen trefoil ornaments containing 160 diamonds. Above the band are eight sapphires surmounted by eight diamonds between which are eight festoons consisting of 148 diamonds.

"In the front of the crown and in the centre of a diamond Maltese cross is the famous ruby said to have been given to Edward Prince of Wales, the Black Prince, by Don Pedro, king of Castile, after the battle of Najara, near Vittoria, A.D. 1367. This ruby was worn in the helmet of Henry V. at the battle of Agincourt, A.D. 1415. It is pierced quite through after the Eastern custom, the upper part of the piercing being filled up by a small ruby. Around this ruby to form the cross are 75 brilliant-diamonds. Three other Maltese crosses, forming the two sides and back of the crown, have emerald centres, and contain respectively 132, 124, and 130 brilliant-diamonds.

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[3] Barbot with some reason gently sneers at "les nombreux ornements qui surchargent peut-être par trop cette pièce tout-à-fait dans le goût Anglais." He estimates the total value of the stones at 3,000,000 frs. or 120,000*l*.

"Between the four Maltese crosses are four ornaments in the form of French fleurs-de-lys, with four rubies in their centres, and surrounded by rose-diamonds: containing respectively 84, 86, 86, 87 rose-diamonds.

"From the Maltese crosses issue four imperial arches composed of oak-leaves and acorns: the leaves containing 728 rose, table, and brilliant-diamonds: 32 pearls forming the acorns set in cups, containing 54 rose-diamonds and one table-diamond. The total amount of diamonds in the arches and acorns is 108 brilliant, 116 table, and 559 rose-diamonds.

"From the upper part of the arches are suspended four large pendant pear-shaped pearls with rose-diamond cups containing 12 rose-diamonds, and stems containing 24 very small rose-diamonds. Above the arch stands the *Mound*, containing in the lower hemisphere 304 brilliants, and in the upper 244 brilliants: the zone and arc being composed of 33 rose-diamonds. The cross on the summit has a rose-cut sapphire[4] ('blue beryl,' Barbot) in the centre, surrounded by 4 large brilliants and 108 smaller brilliants."

SUMMARY OF JEWELS COMPRISED IN THE CROWN.

1 large ruby irregularly polished.
1 large broad-spread sapphire.
16 sapphires.
11 emeralds.
4 rubies.
1363 brilliant-diamonds.
1273 rose-diamonds.
147 table-diamonds.
4 drop-shaped pearls.
273 pearls.

SACRED JEWELS.

GEMS, both unset and set, were from the very earliest times reckoned amongst the most grateful offerings to the gods, and therefore dedicated in profusion in their temples. Thus Boeckh's Inscriptions (dating from the Peloponnesian War) enumerate in the Treasury of the Parthenon: "A large onyx engraved with an antelope rutting, weighing 32 drachms; an onyx, plain, 276 drs. and half an obole; an onyx set in a gold ring; an

[4] There is a tradition that this sapphire came out of the famous ring of Edward the Confessor, so long treasured up on his shrine, and the possession of which gave his successors the miraculous power of blessing the *cramp-rings*. If so, the stone must have been recut for Charles II.

onyx set in a silver ring; a jasper set in a gold ring; a jasper *seal* enclosed in gold (seemingly a mounted scarabeus); a signet in a gold ring; a signet in a gold ring dedicated by Dexilla (the two last were evidently cut in the gold itself); two gem-signets set in one gold ring; two signets in silver rings, one plated with gold; seven signets of *coloured glass*, plated with gold (*i. e.* their settings); eight silver rings, and one gold piece, fine (probably a Daric); a gold ring of 1½ drs. offered by Axiothea, wife of Socles; a gold ring with one gold piece, fine, *tied* to it, offered by Phryniscus the Thessalian; a plain gold ring weighing ½ dr. offered by Pletho of Ægina (a widow's mite); five ear-rings in *tin* offered by Thaumarete."

And this custom flourished down to the fall of Paganism, but the donaria in the shrines of Imperial Rome were of a very different class from the tiny jewels extorted from the devotion of the poverty-stricken natives of Attica. Precious stones, in their native state, and engraved gems, still continued to pour into the sacred treasuries. Every example of unusual beauty or rarity became a thank-offering to the patron-god of its possessor. Pompey consecrates to Jupiter the rarest mineral specimens found in the Pontic treasury; Cæsar, an enthusiastic gem-collector, six caskets of his own choicest intagli to his progenetrix, Venus.—The largest block of crystal ever seen, Pliny tells us, was that dedicated in the Capitol by Livia Augusta. In such a form also did the gems appear, described by Lucian, in his *Dea Syria* (32), as decorating the celebrated statue of that goddess, Astarte:—"Precious stones colourless (diamonds), water-coloured (beryls), fiery (rubies), the sardonyx-stones, hyacinths, and emeralds, brought hither by Egyptians, Indians, Ethiopians, Medes, Armenians, and Babylonians."[5]

Other gems, valuable from their magnitude, were consecrated by engraving upon them the head of some particular deity: an example of which is the splendid pyramidal amethyst (Besborough), thus dedicated to Serapis. The same cabinet, by a singular coincidence, preserves, in No. 10, one of these very offerings to the Dea Syria: a nicolo of unusual magnitude, on which is figured this deity seated on her lion, flanked by the Dioscuri, with the dedicatory legend—

ΟΥΡΑΝΙΑ ΗΡΑ — ΑΜΜΩΝΙΟC ΑΝΕΘΗΚΕ ΕΠ ΑΓΑΘΩ,

[5] These gems, offerings perpetually renewed, were probably stuck by the devotee with wax upon the goddess's lap: this being the established mode of dedicating minute and precious *donaria*, as the same author tells us in his Philopseudes apropos of the statue of Pelichus, which had become the abode of a Lar familiaris.

"To the celestial Juno, dedicated by Ammonius for good luck," marking it a bribe to secure the future patronage of this divinity. Another large gem, figured by Caylus, represents Serapis attended by Venus with various attributes, and the statement that it was engraved KATA XPHMATICMON, "by command of an oracle."

But the most interesting monument of such a dedication, furnishing us as it does with the list of the contents of a wealthy Roman lady's jewel-box, is the inscription given by Montfaucon, Pl. 136, cut upon the pedestal formerly supporting a statue of Isis as is supposed, discovered at Alicante. It records that "by divine command Fabia Fabiana had dedicated in honour of her granddaughter Avita (deceased, it would appear) 112½ pounds weight of silver plate: also, ornaments in the *basilicum* (diadem), one *unio*,[6] and six pearls, emeralds two, *cylindri* (beryls) seven, carbuncle one gem, hyacinth one gem, *ceraunicæ* (rubies) two. In her ears: emeralds two, pearls two. On her neck: a *quadribacium*, or quadruple row of pearls thirty-six, emeralds eighteen. In two circlets (*clusuris*) on her legs: emeralds two, cylindri eleven. In her bracelets (*smialliis*): emeralds eight, pearls eight. On her little finger, two rings with *diamonds*: on the next finger, a ring with many gems (*polypsephus*), emeralds and one pearl; on the *top-joint* of the same finger a ring with an emerald. Upon her shoes, cylindri eight in number."

It cannot be imagined that in the flourishing times of art the Greeks attempted to enhance the divine beauty of their embodied deities by bedizening them in the jewelry of people of fashion, but such had become the regular practice with the superstitious, semi-Oriental devotees of the Lower Empire. A remarkable example is the famous necklace of the most costly stones upon the statue of Vesta, to whose vengeance Zosimus (a devoted adherent to the ancient faith) ascribes the tragic end of Serena, Stilicho's widow, who had despoiled her of it. This was done after her temple had been deserted by its former guardians, in consequence of the confiscation of its revenues by the needy government, though still for some time protected from robbery by the *religio loci*. The historian, though lamenting the cruel fate of

[6] In this list the distinction made between the *unio* and the *margaritum* has to be noted; the former the pearl of spherical shape and vastly the more valuable; the latter the irregularly formed, Pliny's *elenchi* and *crotalea*. The notice of the "two diamond-rings and the emerald-ring on the top joint of the ring finger" is very curious. The value of the hyacinthus is apparent, for but a single one figures in the list. "Gemma" implies it was *engraved*. The pious old lady had evidently offered the entire set of jewels belonging to her deceased grandchild for the repose of her soul.

so worthy a princess—she had been strangled by the command of the miserable Honorius—cannot refrain from instancing the poetical justice of the mode of execution, "which encircled with the cord a throat previously decorated with a necklace obtained by sacrilege from the most venerable of the Roman shrines."

The same custom of dedicating remarkable specimens of precious stones to the honour of the Deity, or his saints, was carried down far into the Middle Ages. In the *paliotto* or chased gold frontal of the high-altar of S. Ambrogio, Milan, is inserted a long oval topaz inscribed ЭIDAIЯVTOV, which can only be interpreted as the votive offering of Riada, some Lombard contributor to its construction in the 9th century. Under *Lychnis* I have noticed the far-famed *karfunkel*, so long believed by report to have lighted up the shrine of S. Elizabeth of Marburg. Leofric, the tenth abbot of St. Alban's, Matthew Paris tells us in his life, in order to relieve the poor in a great famine, sold all the plate belonging to his church, except "certain noble engraved gems now vulgarly called *camei*, for which he could find no purchasers." And the Patent Rolls give a detailed list of the camei collected by Henry III. for the embellishment of the shrine he was constructing for Edward the Confessor. They were over eighty in number; amongst which fifty-five are particularized as "large," and one especially "in a gold setting with a chain to it," is valued at 200*l.*, an incredible sum if brought to the present standard which requires it to be multiplied at least twenty-fold.

Besides these, several precious stones, of large size, especially sapphires, figure in this list, as set in the breasts or held in the hands of the numerous statuettes in gold, which embellished this extraordinary production of the artist-goldsmiths of the 13th century. But the richest assemblage of gems, both intrinsically valuable, and priceless as works of art, was that formerly enriching the abbey of St. Denys. Many of them had come down from the Carlovingian kings, some were presents from the early Byzantine emperors, others trophies of the Frankish conquest of Constantinople. The greater part appear to have been introduced in the ornamentation of the statuettes in gold and silver, and on the reliquaries in other shapes, in devising which the ingenious devotion of the Middle Ages loved to exert its skill and fancy. A most interesting description to the lover of mediæval art, and full of curious details of these riches, drawn up at the time of their greatest splendour, will be found in Marion Dumersan's 'Trésor de S. Denys,' published in 1645.

I. THE CHEMICAL ANALYSIS OF PRECIOUS STONES.

BERYL: EMERALD.

Combination of glucina, silica, and alumina.

	Emerald.	Beryl.
Glucina	12·50	15·50
Silica	68·50	66·45
Alumina	15·75	16·75
Oxide of Chrome ..	0·30	0·00
Oxide of Iron	1·00	0·60
Lime	0·25	0·00

Sp. Gr. 2·76 to 2·73. H. 7·5—8.

Native form: a hexaedral prism terminated in a six-sided pyramid, imbedded in a vein of magnesian limestone traversing hornblende rock.

CALCEDONY.

Consists of silica and alumina.

Silica	84·0
Alumina	16·0

Sp. Gr. 2·6. H. = 7.

Agate, Heliotrope, Onyx, Plasma, Sard, are all varieties of Calcedony differently coloured by metallic oxides.

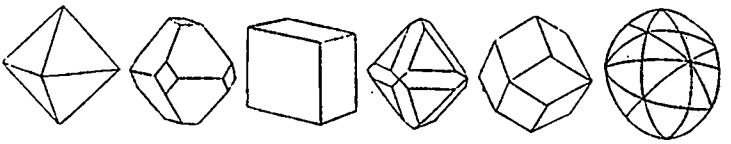
Native form: botryoidal (grape-like) masses; but more frequently found in rolled pebbles.

DIAMOND.

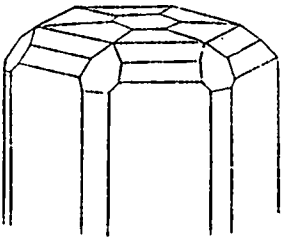
Pure carbon. Sp. Gr. 3·55 (inferior to the Sapphire).

Hardness = 10, the highest in the scale. Highly electric by friction.

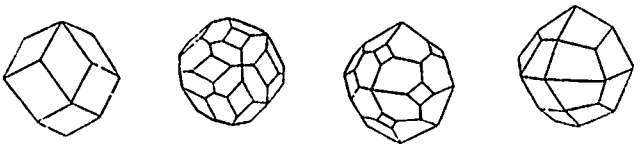
Native form: an octohedral crystal, usually modified by the obliteration of the angles and edges: found mixed with gold-dust in a hard ferruginous concreted gravel.



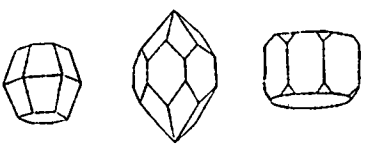
Diamond.



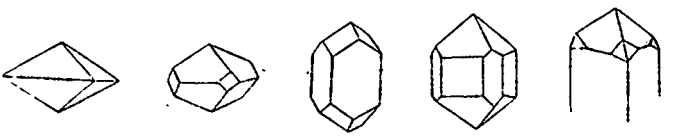
Emerald.



Garnet.



Ruby and Sapphire.



Zircon : Jacinth.

To face p. 410.

GARNET.

Combination of a silicate of the protoxide of iron with silicate of alumina.

Silica	33·75
Alumina	27·25
Oxide of Iron	36·00
Oxide of Manganese	0·25

Sp. Gr. 4·2. H. 6·5 to 7·5.

The native garnet (Almandine) is not electric by friction, but when polished and facetted I have found by experiment that it becomes highly so.

Native form: a rhombic dodecahedron, imbedded in mica-slate, and loose in the earth.

LAPIS-LAZULI.

Silica	49·0
Alumina	11·0
Lime	16·0
Soda	8·0
Oxide of Iron	4·0
Magnesia	2·0
Sulphuric Acid	2·0

Sp. Gr. 2·95. Hardness sufficient to scratch glass.

Found massive, but sometimes in rhombic dodecahedrons.

OPAL.

Combination of silica and water.

Silica	90·0
Water	10·0

Sp. Gr. 2·9. Hardness not sufficient to strike fire with steel.

Found massive imbedded in porphyry and in trap-rocks.

PERIDOT: CHRYSOLITE.

Combination of magnesia, silica, and peroxide of iron.

Magnesia	43·5
Silica	39·0
Oxide of Iron	19·0

Sp. Gr. 3·3 — 3·5. H. = 6·5 - 7.

Primary form: a right prism, with rectangular bases; but occurs more frequently in rounded crystalline masses.

SAPPHIRE: RUBY; ORIENTAL TOPAZ.

Pure alumina, coloured from admixture with oxide of iron.

	Sapphire.	Ruby.
Alumina	98·5	90·0
Lime	0·5	0·0
Silica	0·0	7·0
Oxide of Iron	1·0	1·2

Sp. Gr. 3·99. Hardness only inferior to the diamond. Highly electric.

Native form: six-sided prisms variously terminated, but more frequently found in rolled masses.

SPINEL.

Combination of alumina and magnesia, coloured red by a minute admixture of chromic acid, or blue by the protoxide of iron.

	Red.	Blue.
Alumina	74·50	72·65
Magnesia	8·25	14·63
Silica	15·50	5·45
Lime	0·75	0·00
Protoxide of Iron ..	1·50	4·26

Sp. Gr. 3·5. H. = 8.

Native form the perfect octahedron, like the diamond, and similarly modified.

TOPAZ.

Combination of alumina, silica, and fluoric acid.

	Brazil.	Saxony.
Alumina	47·5	59·0
Silica	44·5	35·0
Fluoric Acid	7·0	5·0

Sp. Gr. 3·49 to 3·56. H. = 8. Highly electric by friction.

Native form: prisms with the sides deeply striated, and the ends very variously terminated.

TURQUOIS.

Considered by Fischer to be only clay coloured by oxide of copper; but Jahn notices—

Alumina	73·0
Oxide of Copper	4·5
Oxide of Iron	4·0
Water	18·0

Sp. Gr. 2·8—3·0. H. 5 to 6.

Occurs in kidney-shaped masses, usually botryoidal, or mimillated.

ZIRCON.

Combination of zirconia and silica.

	Jacinth.	Jargoon.
Zirconia	70·0	66·0
Silica	25·0	31·0
Oxide of Iron	0·5	2·0

Sp. Gr. 4·5 to 4·7. H. 7·5.

Primary form a rhomboidal octahedron, modified like the diamond, but all its angles set obliquely.

II. SELLING PRICE OF PRECIOUS STONES.

Cellini estimates their comparative value, in his *Orificeria*, as follows, for stones of the first quality:—

Ruby, of one carat weight ..	800	gold scudi.
Emerald „	400	„
Diamond „	100	„
Sapphire „	10	„

The gold scudo (8 to the ounce Roman) was equal to nine shillings in intrinsic value, and not much more in its current in Italy, at that time (1560) the richest country in Europe: a point clearly established by Carli (Zecche Italiane) as regards the preceding century.

In the modern trade a *perfect* Ruby, exceeding one carat, is still far higher priced than the Diamond. I have myself seen one of 3 carats, for which 300*l.* had been given: a Diamond of the same weight, according to the rule, would sell for no more than 90*l.* And I was informed on the best authority that a Ruby of still finer quality, weighing only 11 grains, had recently fetched 1100*l.*, or 100*l.* per grain! This being so, the estimate De Boot gives of Rudolf II.'s Ruby, viz. 60,000 ducats (30,000*l.*), falls far below its present value. It was as large as a small hen's egg, and of perfect quality, and came into his possession through his sister, queen-dowager of France. The king of Ava actually possesses one of the same magnitude, and, according to report, a perfect stone, which he wears for an eardrop: a somewhat burdensome decoration.

Emeralds and Sapphires are now equalised in value, selling for 3*l.* per carat when fine. But pale stones of either sort cannot be said to have any definite value in the trade.

For the Pearl: Barbot fixes the price of a perfect one, a carat in weight, at 50 frs. (2*l.*)

The value of the Turquois bears an analogy to that of the Diamond in the rapidity with which it mounts up as the magnitude of the stone

increases. The smallest, those as large as a millet-seed, used for encrusting jewels, sell for no more than sixpence the dozen, whereas a perfect Turquois, when it reaches the diameter of half an inch, is worth 10*l*.

It is impossible to fix the present selling price of the Jacinth, of the Brazilian Topaz, or indeed of any gem no longer in fashion: the dealers buying such stones at nominal prices, and selling them according to the occasion; but Barbot gives 100 frs. (4*l*.) as the highest limit per kilo (2 lbs.) for the best Brazilian Topazes in the rough.

Lapis-lazuli sells in the mass, the finest quality at 30*l*. per pound. It is sawn into slabs for brooches and pendants. The inferior pieces used to be roasted for making ultramarine; but the mineral has been superseded by the cheap prepared cobalt.

III. TABLE OF THE WEIGHTS AND PATTERNS OF THE LARGEST KNOWN DIAMONDS AND OTHER PRECIOUS STONES.

"The King of Portugal's," pea-shaped, as large as a hen's egg, slightly concave on one side, colour deep yellow, and suspected of being a Topaz, weight 1680 car.

"The Agrah," seen by Tavernier, uncut, 645⅝ car.

"The Rajah of Mattan's," found at Landak in 1787, uncut, 367 car.

"The Nizam's," found at Golconda, uncut, 340 car.

"The Great Mogul," found at Coulour, weight in the rough 787½ car., cut as a rose, 280 car.

"The Great Table," seen by Tavernier, 282½ car.

"The Regent," found at Puteal, weight in the rough 410 car., cut as a brilliant, 136⅞ car.

"The Orloff," cut as a rose, 193 car.

"The Star of the South," found in Brazil in 1853, weight in the rough 254½ car., cut as a brilliant, 124¼ car.

"The Koh-i-noor," Indian-cut, retaining nearly its full weight, 186½ car., re-cut (in 1852) as a brilliant, 102½ car.

"The Grand Duke of Tuscany," or "The Austrian," colour yellow, cut as a double-rose, 139½ car. (Said to have been bought for a trifle as a coloured crystal out of a jeweller's shop at Florence.)

"The Shah" (Russian), a facetted prism, 95 car.

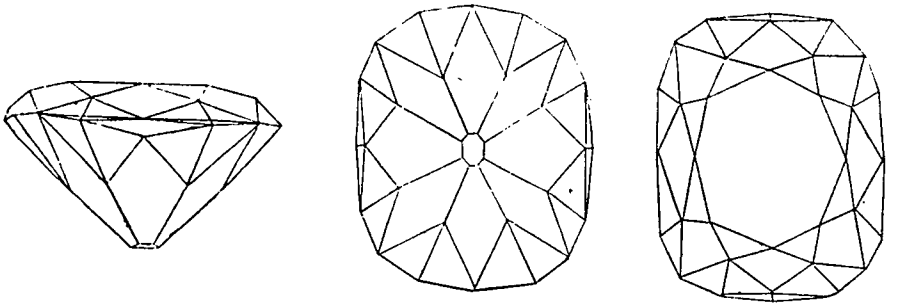
"The Nassack," or "The Pigott" (the Marquis of Westminster's), captured from the Peishwa of the Mahrattas, Indian-cut, 89¾ car., a pear-shaped stone, brilliant-cut in London, 78⅝ car.

"Mr. Dresden's Diamond," from Brazil (1860), heart-shaped, a shallow brilliant, 76½.

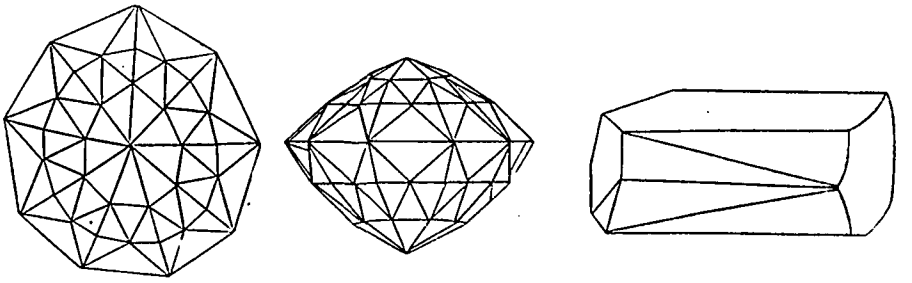
"The Empress Eugenie's," a brilliant, 51 car.

"The Pasha of Egypt's," brilliant-cut, 40 car.

"The Dutch," 36 car.

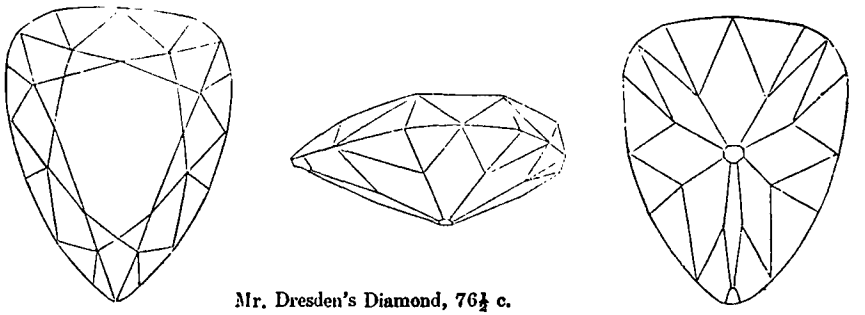


Star of the South, 125 c.

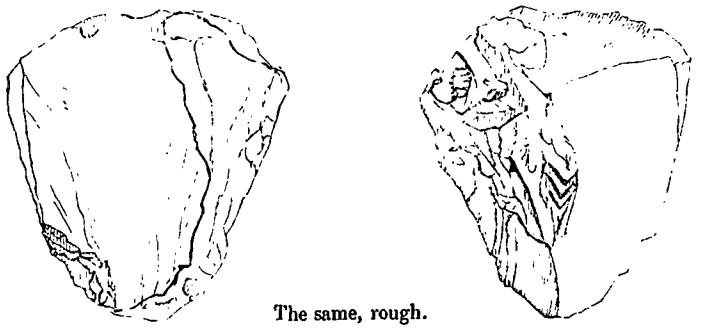


The Austrian, 139½ c.

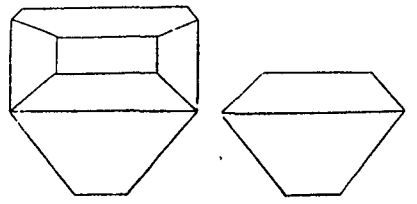
The Shah, 95 c.



Mr. Dresden's Diamond, 76½ c.

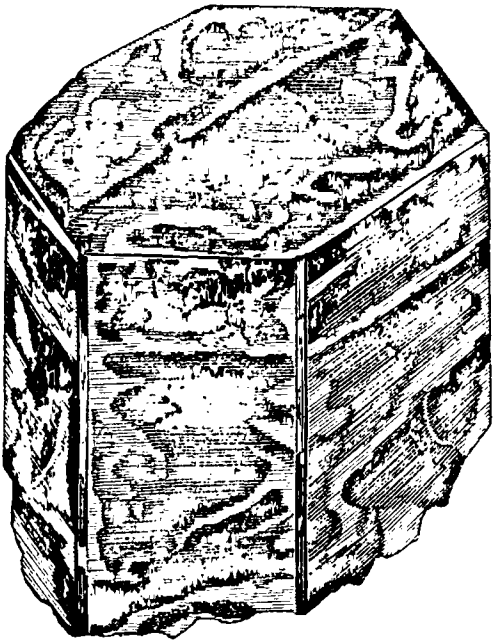


The same, rough.

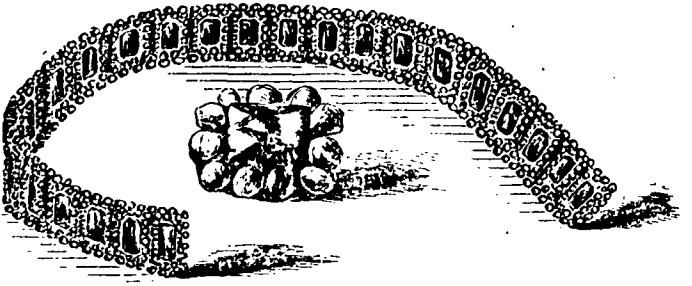


Early Table, 63$\frac{3}{16}$ c.

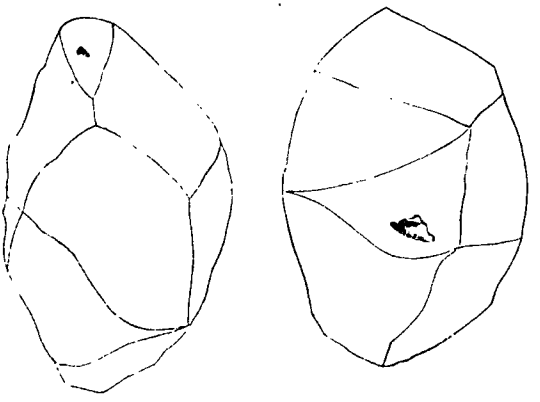
To face p. 414.



The Devonshire Emerald, 8 oz. 18 dwts. found at Muro, near Santa Fé di Bogota: purchased by the Duke from Dom Pedro.



Emerald-girdle of Indian-cut stones. The Persian Diamond, "Sea of light."



"Star of the South," rough, 254½ c.

To face p. 415.

"Hope's Blue Diamond," supposed by Barbot to be that of the French regalia (stolen in 1792), then weighing 67 car., and recut as a brilliant to its present weight, 44⅛ car.

"The Polar Star" (Princess Yousopouff), brilliant-cut, 40 car.

"The Treasury of Dresden's," emerald-green, 31¼ car.

"Halphen's," rose-coloured, 22½ car.

"Prince de la Riccia's, rose-coloured, 15 car.

"Paul I.'s," ruby-coloured, 10 car.

Mawe also mentions as belonging to the Portuguese crown two other stones (rough) of rare beauty: the one weighing 215 car., the other a little less. They were found in the river Abayté, to the east of the district Minas Geraes, by three men banished into the interior. Besides these, he notices two nearly perfect octohedrons of 134 car. and 120 car. each.

The largest Emerald known is the Devonshire, two inches in diameter, and of the finest colour and free from flaws; not cut.

The largest Sapphire, "The Wooden-spoon Seller's," from the occupation of its finder in Bengal, called also the Ruspoli. Lozenge-shaped with six faces, weight 132$\frac{1}{16}$ car. It was bought by Perret, a French jeweller, for 170,000 frs. (6800*l.*). Now in the Musée de Minéralogie.

The largest Pearl in the world is pear-shaped and of a dark opalized tint, It weighs 3 oz. and is 2 inches deep by 4½ in circumference at the bottom. It is mounted as a pendant in an arched crown of five vertical bars, set with brilliants on a lining of crimson enamel, with a gold border of emeralds, sapphires, and rubies. (Beresford Hope.)

The largest Cat's-eye is hemispherical, 1½ inch in diameter, and formerly the chief pride of the king of Candy (captured 1815), and has been celebrated for many ages, as it appears to be the one mentioned by Ribeiro in his 'History of Ceylon' as then belonging to the prince of Ura. It is mounted in massy pure gold, set with ruby cabochons in the Oriental manner. (Beresford Hope.)

COLOURED DIAMONDS.

The Diamond, king of gems, not content with its own inimitable purity, takes a pleasure, as it were, to assume in turn the proper colours of the subject classes, and here also to surpass each one in its own peculiar excellence. The blue diamond combines the azure of the sapphire with its own adamantine lustre, and becomes most lovely by the addition; the rose-coloured far eclipses the ruby, as does the green the emerald, so greatly does its native brilliancy enhance those agreeable colours. There is also a milky diamond which imitates the opal; and the yellow, the commonest of all, the paler topaz. This last tinge, regarded as a great defect, marks the generality of the diamonds coming from Brazil. Rarest of all *was* the black, until the recent discovery of the carbonado, whence now may be cut any number of that antithesis to our idea of the diamond—concentrated darkness in place of light.

The most charming piece of jewelry that I ever beheld was a spray

composed with exquisite taste entirely of coloured diamonds of all the tints that could be collected during ten years' research by the most skilful (and unfortunate) artist-goldsmith who designed and executed the ornament.

This distinction of colour was noticed early. Ben Mansur founds his classification of the diamond upon it as follows:—"1. The White, transparent. 2. The Pharaonic (with no further explanation). 3. The Olive-coloured, or white passing into yellow. 4. The Red. 5. The Green. 6. The Blue. 7. The Fire-coloured. The two first are the commonest, the others rare; but rarest of all that quite polished."

NOTES.

AGATE, p. 15.

Immeasurably first amongst these "nature-pictures" would stand the celebrated Agate of King Pyrrhus, if the description of it given by Pliny (xxxvii. 3) from tradition ("dicitur") was indeed correct. It displayed Apollo holding his lyre, and surrounded by the Nine Muses, each with her proper attribute! all exactly depicted by the native shades and veins of the substance, and without the least assistance from art. A suspicion irresistibly obtrudes itself that such a group, though actually existing in the royal ring, was nothing more than a cameo-engraving, but passed off by the jocose Greek, sporting with their simplicity, upon the Roman envoys, utter novices then in art, as an unparalleled miracle of Nature. By a singular coincidence, when camei first came into fashion for ornaments in this country, they went by the name of Agate-stones. Shakspeare, for example, has the simile—

> "If low, an *agate* very vilely cut,"

besides the well-known description of Queen Mab as

> "In shape no bigger than an agate-stone
> On the forefinger of an alderman."

In the last quotation the comparison as to shape, involving also the idea of *size*, necessarily refers to the *shape* cut on the Agate stone, the tiny cameo nymph or bacchante, the so favourite theme of the artists of the day. In the list of Queen Elizabeth's jewels occurs, "an *agath* of her majesty's visnomy:" Vanderdort similarly calls his catalogue of Charles I.'s gallery "A list of the pictures, coins, and Agates," &c.

Nevertheless it must be owned by all mineralogists who have attended to this particular that Nature has sometimes drawn such artistic pictures on the Agate as to dispose us not altogether to reject as a mere fable the description of that, the boast of the Epirote king. One indeed was lately presented to me which contains within a circular frame a charming little sea-view taken by moonlight. In the foreground lie craggy rocks, then comes the sea receding softly in parallel lines, duly shaded; in the far distance rises a rocky island supporting a pharos; the crescent moon riding high

aloft illumines the scene, aided by a twinkling star or two. The whole painted in different shades of brown and white, is full of repose, and of a feeling strongly reminding one of Bewick's inimitable little vignettes of similar subjects.

The Chinese manufacture monster Agates displaying the most vivid colours, most picturesquely disposed, by staining thin slabs of alabaster by some process of their own; and these fictitious lusus naturæ are often to be seen treasured in this country as singular rarities; yet more wonderful was the invention of the Florentine anatomist (the secret died with him) of petrifying human viscera into real Agates. There is a table-top made up of hearts, livers, lungs, &c., thus agatised into one solid and large slab, preserved in the Hospital of S. Spirito; mete board for a banquet of vampyres.

How firm was the faith of our forefathers in the medical virtues of the Agate is curiously exemplified by a jewel presented to Queen Elizabeth by Archbishop Parker (lately exhibited at the Archæological Institute). It is a large oval Agate, engraved with a fine intaglio in the style of the period, Venus present in Vulcan's forge, and set for a pendant. The parchment accompanying the gift contains a long account of the numerous virtues of the gem, winding up with this dedication, the conceit whereof doubtless passed at the time for one of the happiest in its line—

> "Regni Ἄχος Elizabetha gerit, Matthæus Achatem,
> Cantuar. ei donat, fidus dum vivit Achates."

BORNEO DIAMONDS, p. 34.

Lowe (Sarawak) states that some have been found at Sarawak; but the mines now worked are at Landak, Sangoar, and Benjarmain, which produce stones of small size but of fine water, and occasionally up to 12 and 13 carats in weight.

Africa is reckoned by Pliny amongst the diamond-yielding countries; and his assertion has been lately verified. In 1840 M. Héricart de Thury announced to the Académie des Sciences that diamonds had been found in the river Goumal, province of Constantine, mingled with the gold dust brought down by the stream. One specimen weighing 3 carats was bought for the Ecole des Mines, Paris; another of five grains for the Musée de l'Histoire Naturelle; the third by the Marquis de Drée.

Similarly modern research has confirmed Ammean's notice of the abundance of diamonds in the region of the Agathyrsi. In the gold mine of Adolph, Siberia, between 1830 and 1833, were found upwards of fifty diamonds, octahedrons and dodecahedrons; one of considerable size, the rest from one to three grains in weight. This mine lies on the bank of the Biserek, a brook flowing into the Kama to the west of the Ural, in the government of Perm. The alluvial deposit containing them is of the same nature as that in the Brazilian workings, being a ferruginous clay mixed with a bright red sand, together with quartz crystals, iron-oxide, prases and calcedonies, and black dolomite.

THE REGENT, p. 36.

Uffenbach, a German traveller who visited this country in the year 1712, states, in his most amusing account of his sojourn in London, that he made many fruitless attempts to get a sight of this diamond, recently brought home by Governor Pitt, and the fame of which had already spread over Europe. But there was no obtaining an interview with the far from enviable possessor; so fearful was he of robbery (and not without cause in those days), that he never made known beforehand the day of his coming to town, nor slept twice consecutively in the same house. During the next five years, until the Regent relieved him of it in 1717, Pitt must have found his too precious stone almost as harassing in possession as did the slave, its first finder, who, as the story goes, concealed it in a gash made for its reception in the calf of his leg, until he had the opportunity of escaping to Madras. There the poor wretch fell in with an English skipper, who, by promising to find a purchaser for the stone and to halve the profits, lured him on board ship and disposed of his claims by pitching him overboard. The rogue obtained no more from Jamchund than 1000*l*., which he speedily ran through, and then hanged himself—a most fit conclusion to the whole affair.

The robbery of the Garde-Meuble was effected under the most suspicious circumstances; the regalia, including gold plate of incalculable value, had been sealed up by the Commune of Paris after the massacre of Aug. 10th, and in the following month the seals were found broken, and the locks opened by means of false keys. The thieves were never detected; but an anonymous letter sent to the Commune directed them where to find the Regent and the "Calice de l'Abbé Suger," buried in the Allée des Veuves, the latter stripped of its precious gold-mounting. These two objects were too well-known to be converted into money without certain detection; but the rest disappeared for ever.

The fortunes of Bonaparte may be said to have been founded on the Regent, for after the famous 18th Brumaire, by pledging it to the Dutch government, he procured the funds so indispensable for the consolidation of his power.

THE SANCY, p. 39.

That the diamond known amongst the French regalia down to the year 1792 as the Sancy was *not* the famous one of the Duke of Burgundy may be proved by its weight, in addition to the other reasons already advanced.

The weight of the Sancy was 54 carats, or 3 gros[1] (216 grains). Now De Boot, than whom no person had better opportunities of getting exact information, states that the largest diamond ever seen in Europe was the one purchased from Carlo Affetati of Antwerp by Philip II. in the year 1559; and this weighed 47½ carats. But Philip had been presented with the

[1] The gros was 72 grs.: 8 went to the ounce of Paris.

jewel of his unlucky ancestor six years before that date. Hence it necessarily follows that the weight of the latter bore no comparison to that of Affetati's, and consequently that it did not so much as approach to the 54 carats of the actual Sancy.

The origin of the confusion between this diamond and the celebrated one of Charles the Bold seems to be this. Nicolas Harlai, Seigneur de Sancy, was the early friend and afterwards treasurer to Henri IV., with whom he changed his religion, and acted as his envoy at several courts, Queen Elizabeth's amongst others. In the year 1589 he obtained a certain large diamond (not further described) from Dom Antonio, the pretendant to the crown of Portugal, as security for a loan of 100,000 livres (not repaid). Now the tellers of the story here assume a step and make this to be the stone formerly Charles's, but then in the possession of Philip II.; a change of ownership of all others the most improbable. Harlai being at Soleure, his king and friend wanting to raise a loan upon this diamond, it was sent to him by a trusty servant. He, as the story goes, being beset by robbers, had just time to swallow the diamond before he was murdered. His master, having recovered his corpse, had the lucky idea to open his stomach, counting upon this last expedient of his faithful envoy, and was not disappointed in his expectation of there discovering the lost treasure. But his possession of it was but brief, for, pursuant to his first scheme, he pledged it to the Jews of Metz for a large sum, and being unable to redeem it, he forfeited the same for ever ('Biograp. Universelle'). This diamond, therefore, now disappears from the scene; and there only remains that brought by him "from the East," *i. e.* Constantinople, during his embassy. That he was an amateur in diamonds appears from his purchasing Dom Antonio's in those troublous times. Sancy died in 1627, and we next find, forty-two years later, his well-known jewel in the possession of the "Queen of England."

The Sancy was stolen, together with the regalia, from the *Garde-Meuble*, in the great robbery of September, 1792, and was never recovered. But Barbot asserts positively that a diamond exactly agreeing with its description in all particulars was sold by an agent of the Bourbons (the elder branch) for the sum of 500,000 roubles (75,000*l.*[2]) in the year 1838 to the Princess Paul Demidoff. By a singular freak of fortune this mythical gem returns in our day once more to the East. It has been purchased of the Demidoff family (February, 1865) for the sum of 20,000*l.* on the commission of Sir Jamsetjee Jeejeebhoy of Bombay, by Messrs. Garrard.

ARTIFICIAL IMPROVEMENT OF DIAMONDS, p. 45.

Large stones, besides flaws and specks of different colours, sometimes contain actual cavities filled with a black sediment that discolours their whole mass. How to get rid of such impurities without excision, and the

[2] This sum must be grossly exaggerated: for by the rule $54 \times 54 \times 10 =$ 29,160*l.* is the actual value: and *that* is never realised in the case of very large diamonds.

necessary destruction of the bulk of the stone, is the problem which certain chemists profess to have solved. De Boot positively asserts that his imperial patron, Rudolf II., had discovered a menstruum distilled from antimony, by means of which, with the application of heat, he was enabled to clear diamonds from the flaws, clouds, and colours that detract so greatly from their value. De Boot declares that he had himself seen a stone, bought for 6000 ducats in the first instance, which, after being thus "emendated," was valued at double the sum. "But," adds he, "a secret like this must be divulged to none." It, therefore, like numerous valuable arcana of those "tentative" philosophers, has perished with its discoverer. But now again Barbot, who doubtless had never heard of Rudolf II., boasts of having attained to the same desideratum, and styles himself on his title-page, "Inventeur du procédé de Décoloration du Diamant brut."

ANCIENT BRITISH COINAGE, p. 105.

It has ever been a question with numismatists whether the Britons possessed a national coinage at the time of Cæsar's invasion. The French writers, headed by Mionnet, ever seeking for a sly blow at "perfide Albion," boldly claim every drachm of Celtic coinage turned up in our soil as an importation from some Gallic mint—pretensions which are met with patriotic indignation by the antiquaries of this side of the Channel. By a strange coincidence both parties quote the passage in which Cæsar mentions the money of the Britons: the one to prove that they *had*, the other that they had not a coined money at the time of Cæsar's invasion.

This singular discrepancy in their deductions arises from the simple fact that neither side have observed that Cæsar, in his description of Britain, divides the inhabitants into two classes—colonists and aborigines. The former, whom he describes first, were the *Belgæ* who had passed over from Gaul at different times and with various objects, and had occupied the whole of the coast, retaining however the names of the states from which they had emigrated (v. 12). How far this occupation had been pushed appears from the incidental remark, that "within the memory of people then living, Divitiacus, king of the Suessones (Belgæ), had been lord of all Britain" (ii. 4). Those settled in the province of Cantium, and by far the most civilized of the inhabitants, are noticed as differing very slightly from the Gauls on the mainland in their manners and customs. Now we know that the Gauls had possessed, for perhaps two centuries before this date, an immense gold coinage. As the colonists retained their ancient culture, such as it was, it follows almost necessarily that they kept up the practice of striking coins. They would imitate the types of their national coinage, but more rudely until, by the successive copying of copies, they degenerated into those barbarous designs so far removed from the prototype of all (the Philippus) as to become altogether enigmatical. That these colonists had a coinage of their own is almost involved in the fact of the identity of their civilization with that of their parent states.

In the second place, Cæsar proceeds to describe the aborigines, the "nati

in insula," according to their own tradition; the natural offspring of the land. These, from his picture of them, were complete wild men of the woods, driven far into the interior by the Belgic invaders. As might well be expected, such savages had no coinage at all; of the precious metals they knew nothing; their poor representatives of value were carried about them in the shape of personal ornaments. Cæsar's actual words upon this point are (as the acute Pinkerton has well seen) those to be found in the editio princeps of his Commentaries (Roma, 1469), a passage later so preposterously disfigured by the emendations of over-learned editors, in order to adapt it to their own preconceived ideas. It stands thus:—"Utuntur tamen ære ut nummo aureo, aut annulis ferreis ad certum pondus examinatis pro nummo." Now had these native Britons, like the Gauls, possessed a regular coinage, Cæsar would not certainly have thought such an ordinary usage a thing worthy to be enumerated amongst the *peculiarities* of this newly-discovered race, especially as the rest of his list consists of manners and customs the most diverse from those of the rest of the world. It is therefore evident that he was struck with this their strange substitute for a circulating medium, and deemed it especially worthy of mention.

The estimation of the constituents of this currency coincide with the relative value of the two metals amongst the aborigines—the copper taking the place of gold, the iron of silver; for Cæsar has just before stated that all the copper they used was imported, whereas iron they had, though only in small quantities, upon the sea-coast (doubtless alluding to the old Sussex mines). Metal in thick wire, bent up into rings of a certain weight, was perhaps the very earliest form of currency in the world. The ancient Egyptians knew no other, and to this day it is universal (for copper and gold) with the tribes on the Guinea coast. Such a form is recommended by its portability on the fingers, or of several linked together into a chain, besides the convenient shape of the piece of metal for conversion into other uses.

The above view is corroborated by the fact that no British coins exist that can be attributed to the natives beyond the limits of Belgic influence. None are ever discovered in the region occupied by the Silures, that powerful tribe which maintained its independence the latest of all, nor in the country of the Ordovices, though actually abounding in gold; nor anywhere to the north of the Solway, though so long the seat of an independent British kingdom.

A few years after Cæsar's landing, Cunobeline, a king of the Iceni, the Belgæ of the east coast, having acquired some little tincture of Roman education, gave up the old Greco-barbarian type of the coinage, and endeavoured to imitate that of his patron Augustus, both in design and in make, just as his countrymen upon the Continent were, a little earlier, rudely copying the consular denarii. It may be supposed that the chiefs of the other maritime tribes followed his example, and issued the numerous caricatures of the Roman mintage found in other parts of England, pieces in base silver and copper, struck in the Roman style, flat, not like the Greek, *dished* upon one side. That such a coinage was actually carried on here, until the real subjugation of the island in Nero's reign, is established by a

passage in Gildas (§ 7), recording that after some great rebellion of the natives (apparently that under Boadicea), the Romans changed the name "Britannia" into "Insula Romana;" and ordered that all the metals it possessed should be stamped with Cæsar's image: "et quidquid haberi potuisset æris argenti vel auri imagine Cæsaris notaretur."

THE "HALL-MARK" STANDARD OF GOLD, p. 112.

The "Hall-Mark," so called because impressed at the Goldsmiths' Hall, is the stamp authenticating the fineness of the metal sold. It consists of four punch-marks, struck upon some inconspicuous part of the article, containing respectively the initials of the maker, the head of the reigning sovereign, the number of the carats *fine*, and a letter of the alphabet. The last is a relic of a clumsy and truly mediæval mode of declaring the date: twenty letters from A downwards complete a cycle of as many years, which ended, the same letters but of a different type, recommence a fresh cycle. By referring to the list of these letters (obtainable at the Hall) the date of any piece of plate can be ascertained as far back as the year 1696. But the custom dates from unknown antiquity. Until the present century no *gold* was allowed to be Hall-marked if of lower standard than 22 carats; then that of 18 (or one quarter alloy) was permitted, as being a quality best adapted for watch-cases, chains, and jewelry designed for hard wear. But some few years ago a Bill, inspired by the Birmingham interest, was smuggled through Parliament, the collective wisdom of the three kingdoms not being sufficiently practical to espy its true object, that of legalising the grossest fraud. By this Bill it was allowed to Hall-mark gold of 15, of 12, and (it sounds incredible) as base as 9 carats! mere *aurichalcum* or *billon*. This concession, wheedled out of ignorance by roguery, has fully answered the ends of its promoters; articles in this vile alloy, strongly gilt, are sold under the time-honoured prestige of the Hall-mark. Few purchasers are aware of the change in the law: the carats are marked, it is true, but the minute numerals are unobserved, or purposely obscured.

Our standard for silver (both coin and plate) from the Norman times down, has been very high, only 18 pennyweights alloy to the pound Troy, or less than one-twelfth. Under William III. this standard was, for a few years, raised to quite *fine* for plate alone, to prevent, it would seem, the melting-down the coin for that purpose. Plate of this quality is stamped with a figure of Britannia in one of the punch-marks. But to the disgrace of our times, the Bill above-mentioned also legalised a similar imposition upon the buyer (the exact extent however has escaped my memory) in the quality of silver plate, disguised by the proviso "for exportation."

TURQUOIS, p. 140.*

"The *Turquois*" (De Boot *loquitur*) "is believed to strengthen the sight and spirits of the wearer; but its chief commendation is against falls, which everybody believes it takes upon itself, so that the wearer escapes hurt—a

* This quotation illustrates a note at p. 140.—C. W. K.

property beyond the scope of reason. I can solemnly affirm that I always wear one set in a ring, the property of which I can never sufficiently admire. Thirty years ago it had been worn by a Spaniard living not far from my father's house. On his death, when his goods were sold off (as is the custom with us), amongst the rest the Turquois was put up. No one, however, would bid for it, although many had come to buy it on account of its choice colour in the lifetime of the former owner; for it had entirely lost its original beauty and lustre, so that it looked more like Malachite than a Turquois. My father and brother were present, thinking to bid for the gem, which they had often admired aforetime, and were astonished at the change. My father, however, purchased it for a mere trifle, because everybody thought it was not the same that the Spaniard used to wear. When my father came home, thinking it scorn to wear so ugly a gem, he made me a present of it, saying, 'Since the story is that a Turquois, to exhibit its power, must be presented when one is at home, I now make you a gift of it.' I took the gem to an engraver to cut my arms upon it, as is done upon Jasper, Calcedony, and other cheap stones, not choosing to wear it, having lost all its beauty, merely as an ornament. I received it back from the engraver, and wore it for a signet-ring. Hardly was it on my finger a month when its original colour returned, though not so bright as before, in consequence of the engraving and the inequality of its surface. Everybody was surprised, more especially as the colour grew finer every day. Perceiving this, I never took it off my finger, just as I do still. Its wonderful virtue in the case of a fall (if really proceeding from it) I have myself experienced. For returning on horseback to Bohemia from Padua, where I had taken my Doctor's degree, a guide I had hired to show me the way shows me a footpath by the side of the high road, which I take, and ride on some time in the dark. Suddenly my horse stands still, and will not move a step. I call my guide: he says there is a well in the path, and that I must go back, the path being very narrow. In turning my horse he stumbles, and puts his left foot outside the path, towards the high road. Immediately I feel myself falling, I throw myself out of the saddle upon the road, which was at least ten ells lower down than the path. I fall on my side, and my horse on his back close to me. The guide, not hearing me cry out or speak, thought me crushed to death by the horse; but I was safe and sound, had suffered no harm at all, get on my steed, and pursue my journey. But next morning, as I was washing my hands, I found my Turquois split, and about a quarter of its substance separated from the rest. I therefore got the larger portion of the stone reset, and continued to wear it some years. One day in attempting to lift out of a river, with a long pike, a weight beyond my strength, suddenly the bones of my chest cracked as though a rib were broken, and I felt a dull pain in the side. Thinking something was fractured, I examined, and discovered that the lowest rib was displaced, and its end pushed under the last but one. As the pain was slight, I applied no remedy to the part affected; but the same day, to my surprise, I see my Turquois again broken in two, the smaller portion, however, being no bigger than a hempseed; but lest it should drop

out, I had the larger portion, retaining nearly all my arms, set in another ring, which I still wear constantly."

With the Germans it is still the gem appropriated to the ring, the "gage d'amour," presented by the lover on the acceptance of his suit, the permanence of its colour being believed to depend upon the constancy of his affection. Inasmuch as this stone is almost as liable to change, and as capriciously as the heart itself, the omen it gives is verified with sufficient frequency to maintain its reputation for infallibility.

De Boot's statement of the fashionableness and value of the stone in his times illustrates Shakespeare, where he makes Shylock say he would not have lost his Turquois ring "for a whole wilderness of monkeys."

RUBY, p. 152.

Tollius quotes Wolfgang Gabelchow touching a singular property of the Ruby:—"It is worthy of notice that the true Oriental Ruby foretells to the wearer, by the frequent change and darkening of its colour, that some inevitable misfortune or calamity is not far off; and in proportion to the greatness of the evil, so does it assume a greater or less degree of darkness and opacity—a thing which I have heard frequently from persons of the greatest eminence, and have, alas! experienced in my own person. For on December 5, 1600, as I was travelling from Stutgard to Calloa, in company with my beloved wife Catharine Adelmann, of pious memory, I observed most distinctly during the journey, that a very fine Ruby, her gift, which I wore set in a ring upon my finger, had lost once or twice almost all its splendid colour, and had put on obscurity in the place of splendour, and darkness in the place of light, the which blackness and dulness lasted not for one or two days only, but several: so that being above measure alarmed, I took the ring off my finger and locked it up in my trunk. Wherefore I repeatedly warned my wife that some grievous misfortune was impending over either her or myself, as I had inferred from the change of colour in my Ruby. Nor was I deceived in my forebodings, inasmuch as within a few days she was taken with a mortal sickness that never left her till her death. After her decease, indeed, its former brilliant colour again returned spontaneously to my Ruby."

NEPHRITE: JADE, p. 238.

This singular mineral is a combination of magnesia and silica, with small proportions of alumina and the oxides of iron and of chrome. In colour it varies from a clear, agreeable olive, the most esteemed, to a soapy greenish white. It is excessively hard, tough, and difficult to work, and appears even to have baffled the skill of the difficulty-seeking gem-engravers of the Renaissance, no works in their peculiar style existing in Jade; and yet they had every inducement to essay the material, from the high reputation it enjoyed in those times.

This reputation rested upon its supposed virtue as a specific remedy, or

rather as a prophylactic against all diseases of the kidneys, whence its popular name, contracted from "Pietra di hijada" (kidney-stone), given to it by the Spaniards. They introduced the stone, together with, as it would appear, the belief in its peculiar virtue, from the New World, very soon after its discovery. In its efficacy even the practical De Boot was evidently a firm believer; and the prices quoted by him also testify to the universal faith in its importance, a piece no larger than a half-thaler selling for 100 crowns; whilst a mass of sufficient dimensions for a good-sized cup, then in the possession of the imperial jeweller, was valued at 1600 thalers.

Strange to say, this most obdurate material has held the same place amongst certain barbarian races, though most remotely situated from each other, that was occupied by the Onyx amongst the most refined nations of antiquity. The Mexicans, when first discovered, employed the Jade as their chief jewel, after the Emerald; and had learnt how, by some process now unknown, to cut it with much ingenuity into various fantastic shapes, such as fishes, and parrots' heads or beaks.[3] Three centuries later, a far ruder race, the New Zealanders, were found making it the badge of superior rank, worn by their chiefs in the ear, either cut into the shape of a hook, or else of a thick cylinder, perfectly even, and highly polished. Like the Mexicans, they selected for such jewels the pure, translucent green pieces. The coarser kind was formed, with equal ingenuity and astonishing labour, into the blades of their adzes.

With the Chinese, however, it is the material above all others for the glyptic art, such as theirs is. The clear green sort, indeed, they value above every precious stone, and employ in the form of beads. The Emperor's own necklace, lately captured in the sack of the Summer Palace, was composed of such spheres placed singly at intervals, marking their value, between several of the finest coral, each as large as a cherry, the pendant being a monster Spinel, or perhaps a red Tourmaline. The greyer species, obtainable in larger masses, serves for making vases, cups, and for large circular plaques used for clasps to the belt, most elaborately carved into open work of foliage and flowers, in the same style of ornamentation as their works in ivory. How they have obtained such a mastery over so difficult a subject-matter remains a mystery to Europeans. Some pretend, but it would seem merely on conjecture, that the stone is softer when first extracted from the vein, and acquires its hardness by baking after having received its carving and polish.

This stone never found its way to Rome, which it might have done along with the other productions of the remotest East, so largely imported thither. No pieces of Jade ever came to light bearing the unmistakable impress of antique art, although a few intagli in opaque Calcedony might be mistaken for it. Pliny indeed notices the *Adadunephros*, the "kidney of Adad,"

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[3] There is good reason for suspecting that the three famous emeralds of the Incas also, enumerated amongst Pizarro's plunder, cut into the shapes of a rose, a bell, and a fish, were in reality only pieces of pure green jade.

the Syrian Belus; but as he specifies also the "eye" and the "finger" of the same deity, it is evident these names apply only to the shape, not to the efficacy of those stones.

AMAZON STONE.

A very compact Felspar of an emerald-green colour, but opaque, and with nacrous reflections; extremely hard, and taking a high polish. Its name comes from the circumstance of the Spaniards having first observed it in the hands of the Indians dwelling upon the Amazon. Like the Jade, this equally obdurate material was a favourite vehicle for ancient Aztec art. Grotesque figures in it of gods and of beasts, wonderfully rude in design, but very skilfully carved and polished, are frequently to be met with. All these sculptured objects are bored, and must have been worn on a string round the neck, like the similar sacred figures of the old Egyptians.

It is not quite certain to me whether this stone was known to the ancients, either Oriental or European. It is true that the Assyrian cylinder assigned to Sennacherib is described as cut in Amazon-stone; and certain camei, apparently Roman, and actually in Amazon-stone, have fallen under my own observation, yet as the latter *may* be of the Renaissance epoch, their existence does not settle the point, to my satisfaction at least. The above-quoted cylinder, indeed, recalls to one's memory two gems, named by Pliny as coming from Persia, both of which seem, from his brief notice of them, to bear certain analogies to the Amazon-stone. His first is "the Tanos, in colour a disagreeable green, and which is foisted in amongst the Emeralds;" and certainly the camei in Amazon-stone, above adduced, had much the appearance, and in fact were catalogued as on Emerald. His other is "the Eumithres, or Gem of Belus, of the colour of the leek-leaf, and a favourite in their superstitions"—a character which would give the stone strong claims to the honour of serving for the royal signet.

THE RING OF POLYCRATES, p. 309.

Pliny, with his accustomed happy brevity, thus condenses the long rambling legend narrated by Herodotus:—"The estimation of precious stones had grown into so mighty a passion that Polycrates the Samian, tyrant of the isles and coasts of Asia Minor, was persuaded that in the voluntary loss of a single gem would lie a sufficient atonement for his own prosperity, which even he, the prosperous one himself, owned was too great to last; and that, if he wished to balance accounts with the fickleness of Fortune, he could amply buy off her spite by suffering this single grief, being fatigued with uninterrupted happiness. Putting out therefore to sea, he threw in his signet-ring; but a fish of remarkable size, born for the royal table, snapped it up for food, in order to give the omen, and restored it to the owner in his kitchen, from the hand of that Fortune who was plotting his destruction." Amasis, the wise Egyptian who had counselled this mode of atonement, on hearing of this last proof of the pertinacity of Polycrates'

good luck, solemnly renounced his alliance, being persuaded that he would have most signally to pay for all in the end: as soon proved true, for having fallen into the hands of Orœtes the Persian, he was impaled.

There can be little doubt this tale of "the Fish and the Ring" is true. Fish, especially the mackerel, greedily swallow any glittering object dropped into the sea; and within my own recollection, one when opened was found to contain a wedding-ring.

That this stone was the true Emerald is evident from the enormous value attached to it. With the Grecks it long continued the established medium for the signet of the prince. This may be deduced from Pliny's words (xxxvii. 4):—"It is clear that in the times of Ismenias even the Emerald used to be engraved. This opinion is confirmed by an order of Alexander the Great, forbidding any other artist, except Pyrgoteles, doubtless the most eminent in the profession, to engrave his portrait upon *this gem*." And again we may draw the same conclusion from an anecdote Plutarch tells of Lucullus (cap. iii.) to illustrate his disinterestedness. Being sent on an embassy to King Ptolemy Physcou, he not merely refused all the splendid presents offered him, amounting in value to eighty talents (£16,000), but even received of his table allowance no more than was absolutely necessary for his maintenance; and when the King attended him down to his ship, as he was about to return to Rome, and pressed upon his acceptance an Emerald "of the precious kind," set in gold (for a ring), he declined this also until Ptolemy made him observe it was engraved with his own portrait, whereupon fearing his refusal should be considered a mark of personal ill-will, he at last accepted the ring as a keepsake.

This notice of royal Emeralds may be aptly concluded with an unparalleled specimen of Oriental caprice and extravagance. It is a finger-ring cut out of a solid piece of Emerald of remarkably pure quality; with two Emerald drops and two collets set with rose Diamonds and Ruby borders in Oriental mountings, formerly belonging to Jehanghir, son of Akbar, Emperor of Delhi, whose name is engraved on the ring. Diameter, $1\frac{1}{4} \times 1\frac{1}{8}$ in. This ring was presented by Shah Soojah to the East India Company, and was purchased by the late Lord Auckland, when Governor-General of India. Now in the possession of the Honourable Miss Eden.

NERO'S EMERALD LORGNON, p. 322.

Jan considers "in smaragdo" the true reading; and this Marbodus must have found in his copy, for he makes Nero employ his Emerald as a mirror. Barbot overthrows my explanation in the text by stating that the Emerald, though cut ever so thin, would not permit distant objects to be seen through it, which fact, if correct, settles the matter. That a stone set in a ring can serve as a mirror appears from the anecdote related by Camerarius of his patron Maximilian II. On the visit of this Emperor to Ratisbon, the city had presented him with a gold cup full of ducats. Whilst all the courtiers were engrossed in looking out of the windows at a grand show given in the

streets in honour of the occasion, the Emperor detected, "by the reflexion in the stone of a ring" upon his finger, one of their number taking advantage of the occasion to slip unobserved to the cup, still standing on the table of the reception-room, and help himself to a handful of its contents.

TASSIE'S PASTES, p. 359.

Tassie, a Scotch sculptor established in London (1770-1790), brought out an enormous series of pastes and enamels, from gems of all dates and styles, to the number of 15,000. He commenced with those taken from the entire collection of Stosch; and subsequently reproduced every famous gem then known in all the cabinets of Europe. His pastes, however, are much inferior in finish and in quality to the Regent's. Tassie employed Raspe to publish a catalogue raisonné of the series, illustrated with etchings, slight, though well drawn, by Allen of Edinburgh: the most useful book the student of dactyliography can possess.

DESCRIPTION OF THE TAIL-PIECES.

All drawn to twice the size of the Originals.

Title-page.—Serapis, lord of the subterraneous world, and of all its treasures, represented with the attributes of Ammon and of Phœbus; for, according to the pantheistic religion of the age, all these deities were only types of the Sun. The profile of the god seems intended for that of M. Aurelius; of the art in whose times this intaglio may be pronounced the finest specimen in existence. The *legend* occurs on an altar dedicated to the same god, in the Villa Albani. Sapphirine Calcedony.

P. vii.—Democritus: the earliest Greek writer on mineralogy. His portraits, as Raspe has observed, have much of the character of those of Socrates. But on comparing this with the Socrates, p. 340, the difference in the expression, and in the form of the beard, proves clearly enough that they represent two different individuals; though both of the same sarcastic, "ironical" genius. Greek. Dark-brown Calcedony.

P. x.—Head of Proserpine, wearing the Sicilian hair-net, and *mitra*, or head-cloth. Greek. Brown Calcedony.

P. 13.—Hercules in the act of letting fly an arrow at the Stymphalian Birds. It will be noticed here, as in all other representations of early Greek archery, that the arrow is propelled by the elasticity of the string alone, not by that of the bow, which remains almost rigid. A recent traveller in Caffraria informs me that the bow of the Bushmen acts on precisely the same principle, itself not bending in the least, whilst the string of twisted gut yields to tension sufficiently to drive very heavy iron-headed arrows with enormous force. Early Greek work. Yellow Sard.

P. 18.—Mask of an old Satyr and a female Comic Mask conjoined. Masks were amongst the most popular devices for the signets of the ancients, from their supposed virtues as amulets. In fact, the word *mask* comes from *ταλάμασκα*, "a bugbear," the low Greek form of *βασκανὸς*, "fascinum." Roman. Pale Sard.

P. 48.—Silenus playing upon the double-flute; the instrument appropriated to Bacchus and his train. Greco-Italian. Pale Sard.

P. 56.—Bust of the youthful Cæsar, Diadumenian, son of Macrinus. Instead of the usual spear, he wields the rudder of Fortune; an ingenious piece of flattery, but contradicted by his fate. Roman. Sard.

P. 66.—Bacchus advancing and proffering his gifts to mortals, grapes and the goblet; the blazing flambeau alludes to the nocturnal celebration of his rites. The profile much resembles Nero's: and we learn from Statius (Lucani Geneth. 125) that it was the established mode to deify beloved friends under the form of this god. Roman. Striped Agate.

P. 77.—Dolphin and Trident: a type seen upon the coinage of several maritime cities. The initials in the field may indicate that the dolphin is sacred to Poseidon (Neptune). Greek work. Dark Sard.

P. 90.—Artist modelling a bust in wax. It rests upon a *turbo*, or wooden column, which can be turned by the foot to bring each part of the work at pleasure under the hand of the modeller. Roman. Reddish-brown Sard.

P. 124.—Two Cupids supporting a *clepsydra*: a contrivance for measuring time by the escape of water through a small orifice. From the sun and the horse engraved upon the vase, there is good reason for supposing it a representation of the actual time-keeper used in the Circus Maximus. Roman. Striped Agate.

P. 129.—The child Opheltes destroyed by the serpent, as Statius describes his death—

"Præcisum squamis avidus bibit anguis Opheltem."

The Isthmian Games were instituted in his honour. This type therefore may mark the signet of some victor at those games. Roman. Red Jasper.

P. 135.—The "Fortuna Fortis" or "Equestris" of Antium. She and her twin-sister the "Fortuna Felix" (her head diademed) are represented, side by side, upon a denarius of the family Rustia. On the coin she holds in her hand the same little disk that here on the gem appears in the bill of the bird: perhaps intended for one of the celebrated lots consulted in her temple. The ant, attribute of Ceres (as being the first builder of granaries), introduced in the field, expresses Fortune's despotic sway over the produce of the earth, or "rus," indicating by a rebus the owner's name. Horace addresses this very goddess with—

"Te pauper ambit sollicita prece
Ruris colonus" . . . . . .

Early Roman. Plasma.

P. 143.—Jason consulting the Pythian Oracle as to the success of his expedition. The serpent, Python, twined round the column, and the raven, Apollo's bird, upon its summit, exactly define the meaning of the group. The ram below represents the customary sacrifice. This seems to me a better founded explanation of this design (a favourite one with the Greeks) than Tölken's, who sees in it a warrior consulting the Latian Oracle of Picus. Greco-Italian. Tricoloured Agate.

P. 152.—Syren playing the lyre. The sun, the palm-branch, and the letters KAΠ, in the field, warrant a conjecture that the gem was the signet of some one (perhaps Statius himself) who had obtained the prize for *poetry* instituted by Domitian at the Capitoline Games. Roman. Dark Sard.

P. 156.—The Gallic Mars of Treviri, armed with a curiously-formed, scroll-shaped shield, and the peculiar Gallic weapon the *lancea*. Reverse of a coin of Constantine.

P. 160.—The Good Shepherd. In the field are seen the sun and moon conjoined, that most ancient emblem of a divine presence. The letters seem to imply IAH . N(omen), "The Name Jehovah." A relic of very early Christian times, perhaps dating from the end of the second century, to judge from the goodness of its style. Roman. Red Jasper.

P. 162.—Apollo, conspicuously displaying his shoulder, Horace's "candentes humeros." The words in the field (BAI, *prize*, Coptic) are an addition of later times, converting the gem into a talisman. Greco-Italian. Sard.

P. 164.—Locust mounted upon a goat. The insect enjoyed a mighty reputation as an amulet against the Evil-eye: on which account Pisistratus set up its figure in the Acropolis. Roman. Sard.

P. 169.—Fate holding her distaff; the thread and spindle drop from her right hand. Early Greek. Brown and shaded Agate.

P. 172.—The foot of Hermes, messenger of Death, crushing the butterfly, Life. Roman. Jacinth.

P. 185.—The caduceus of the same god. Alexandrian Greek. Brown Calcedony.

P. 192.—The same deity, evoking a ghost from Hades by virtue of his caduceus. The letters in the field are the added initials of some later Roman owner. Greco-Italian. Banded Agate.

P. 210.—Serapis; in the field the serpent of Esculapius, whose place he usurped in the later mythology. Dark-red Sard, verging upon Red Jasper. Late Roman.

P. 215.—Goddess enthroned upon a *thensa*, or sacred car, drawn by two elephants. This type symbolises "ÆTERNITAS," as we learn from a medal of Faustina's on which it occurs. This gem probably alludes to the deification of that empress. Amongst the Stosch Gems there is an antique paste taken from this identical stone. Roman. Bright-yellow Sard.

P. 234.—Bust of Sapor II., borne up on four wings, as a deity. In the field the sun and moon conjoined, expressing the same idea. Legend, "Piruz Shahpuhri," the victorious Sapor: a title (*Pyroses*) which Ammian mentions as given to that king by his soldiers. Persian (about A.D. 350). Almandine.

P. 251.—The goddess Roma watching over Romulus and Remus, suckled by the she-wolf, whom the shepherd Faustulus has just discovered. Early Roman. Sard.

P. 269. Mask of an old woman, the comic *nutrix*. Greek. Brown Calcedony.

P. 275.—Victory borne through the air in the serpent-car of Ceres. It being an established rule that no signet-device was ever merely capricious,

and devoid of any serious meaning, we may conjecture in this an allusion to the restoration to the state, through the instrumentality of the signet's owner, of some corn-producing province, Sicily or Africa, the result of a recent victory. Early Roman. Sard.

P. 282.—Warrior twining a fillet, a customary mark of respect, around a sepulchral column. From the cautiousness expressed in his approach on tiptoe, it seems intended for Orestes secretly visiting the tomb of Agamemnon. Early Greek. Sard.

P. 284.—The expiring Medusa: after the type created by Praxiteles. An admirable imitation of the Sicilian-Greek manner; the work of the Italian school of the last century. Black Jasper.

P. 287.—Ajax, the gigantic, rescuing the corpse of Achilles; his vast sevenfold shield rests dropped upon the ground. Early Roman. Dark Sard.

P. 290.—The Sign Capricorn (horoscope of Augustus) mounted by the genius of the *native*, "natale comes qui temperat astrum." The trident he wields declares the rule of the Sign over the waves "tyrannus Hesperiæ Capricornus undæ." Early Roman. Sard.

P. 292.—Gallic Trophy, expressing the triumph of the Consul P. Cornelius Cethegus (B.C. 197) over the confederate Insubres and Cænomanni upon the Mincio; the confederation being denoted by the two Gallic shields *en saltire*. The horse is the emblem of Gallia. This gem was engraved for the signet of a Q. Cornelius Lupus, of the same family as the Consul, and, it may with reason be presumed, a sharer in his victory. Roman. Sard. (Waterton Collection.)

P. 301.—Brutus the Younger: a contemporary portrait. Sard.

P. 310.—The Great Marcellus. This portrait exactly coincides with one upon a denarius of the gens Claudia struck in the next generation. The shield introduced in front alludes to the *spolia opima* won by him from the Gallic king Viridomarus. Contemporary work. Sard.

P. 327.—Comic Mask: the moustache marks it as belonging to the character of a barbarian. Roman. Black Agate.

P. 329.—Julia Titi, as Juno, crowned with the peacock: an idea borrowed from the primitive Egyptian mode of depicting their queens similarly crested with the phœnicopterus. A contemporary portrait. Yellow Sard.

P. 335.—Snail-shell, whose proper inmate is replaced by an elephant in this case, as in others by a lion, or a pigmy. Such combinations were not mere *jeux d'esprits*, but amulets against the Evil Eye; for which end, the more unexpected and ludicrous the object, the more effectual was it. Roman. Sard.

P. 340.—Socrates. Roman. Sardonyx.

P. 343.—Cybele: but the features are easily recognised for those of Faustina Mater, so deified. Contemporary portrait. Red Jasper.

P. 374.—Cupid illumining with his torch and peeping into the depths of a vast Corinthian *crater*, containing a palm-branch: a skeleton, Ovid's

"*ossea larva*," its former occupant, startled at the hateful light, is casting himself headlong out of the vessel. If a conjecture may be hazarded as to the meaning of this truly mystic design, based upon the well-known fact of the introduction of the skeleton at the ancient banquet, it may be considered as equivalent to the Epicurean device of Pardalas (Stosch's 'Gems'), two lovers, with the motto, "Drink, enjoy thyself, love: thou must die, Pardalas! and thy time is short." Roman. Onyx.

P. 398.—Apollo Agyieus presenting his bow in token of amity. This is a favourite type on the coinage of the Seleucidæ, the god being the reputed founder of their line; and taking into account the beauty of the work and the value of the stone at that epoch, it is not unwarrantable to see here the actual signet of one of the early kings of Syria. Greek of the best period. Peridot, remarkably lustrous.

P. 428.—Child's head in front-face. For some unexplained reason such faces, especially in cameo (worn for *phaleræ*), were esteemed most effectual amulets. Some of them are indicated by the single tress on the forehead as representing the boy-god Horus; but many, like the present, have a character of individuality, evidently bespeaking them portraits from the life of some darling infant. The legend "of Tychias" declares the father of the original, and the owner of the signet. Roman. Sard, dark-red.

P. 433.—Cupid guiding a dolphin by the sound of his flute: his brother, floating in the air overhead, holds up by the tail a second dolphin, thus extemporising a natural sail. Roman. Red Jasper.

P. 442.—Sphinx seated. The same type as that on the coins of Chios. Early Greek. Black Jasper.

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